DECEMBER 22, 1952

NEWS ISSUE

Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

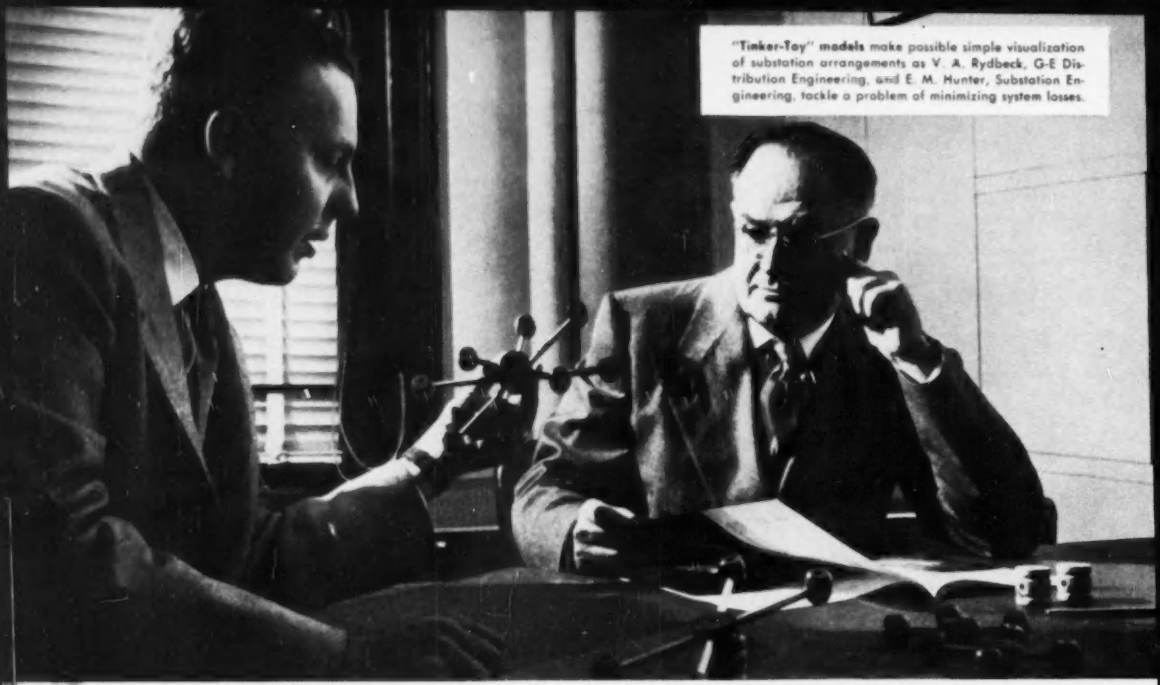
The Big Ten in Customers

1	Consolidated Edison Co of New York	2,792,550
2	Commonwealth Edison Co	1,762,645
3	Pacific Gas & Electric Co	1,402,675
4	Public Service Electric & Gas Co	1,234,287
5	American Gas & Electric Co	1,231,690
6	Southern Co	1,114,331
7	Southern California Edison Co	1,055,717
8	Detroit Edison Co	1,013,223
9	Philadelphia Electric Co	962,551
10	Niagara Mohawk Power Corp	936,249

For rankings of other companies see Page 32

Canadian Systems Meet a Challenge . . . Page 16

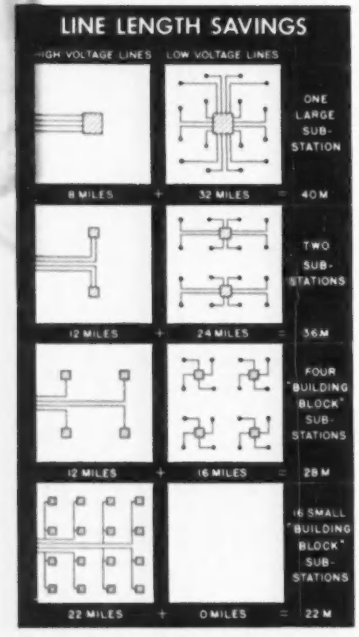
Al Penniman's Job . . . Page 22



"Tinker-Toy" models make possible simple visualization of substation arrangements as V. A. Rydbeck, G-E Distribution Engineering, and E. M. Hunter, Substation Engineering, tackle a problem of minimizing system losses.

"Building Block" approach to substation planning helps

REDUCE SYSTEM LOSSES, CUT COSTS


LINE LENGTH SAVINGS
HIGH VOLTAGE LINES
LOW VOLTAGE LINES
ONE LARGE SUB-STATION
8 MILES + 32 MILES = 40 M
TWO SUB-STATIONS
12 MILES + 24 MILES = 36 M
FOUR "BUILDING BLOCK" SUB-STATIONS
12 MILES + 16 MILES = 28 M
16 SMALL "BUILDING BLOCK" SUB-STATIONS
22 MILES + 0 MILES = 22 M

Based on theoretical 16-sq. mile load area with 16 feeder points, these diagrams show savings in line mileage with more and smaller substations.

Standardized small substations are now playing an important part in reducing overall costs on many systems.

Spotted where and as the load develops, they not only make possible a flexible building block approach to substation planning, but also pay off in reduced power losses.

The use of many small substations permits more power to be distributed at higher subtransmission voltages and less on the lower voltage circuits where maximum loss occurs.

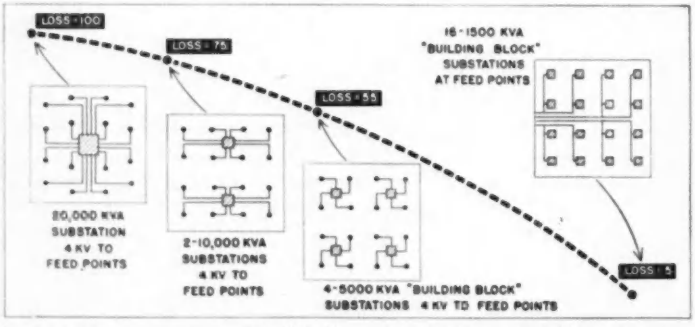
Building block systems make possible considerable savings in overall line mileage. With shorter feeders, voltage regulation is less of a problem. And since small substations inherently mean lower fault currents, they often permit the use of less expensive cutouts in areas of high load density.

For more detailed discussion of these savings, write for GER-667, a reprint of a recent technical paper. General Electric Co., Schenectady 5, N. Y.

301-211

MORE POWER TO AMERICA

GENERAL ELECTRIC


LOSS = 100
LOSS = 75
LOSS = 55
LOSS = 5
16 - 1500 KVA "BUILDING BLOCK" SUBSTATIONS AT FEED POINTS
80,000 KVA SUBSTATION 4 KV TO FEED POINTS
2-10,000 KVA SUBSTATIONS 4 KV TO FEED POINTS
4-5000 KVA "BUILDING BLOCK" SUBSTATIONS 4 KV TO FEED POINTS

Power losses on some systems amount to 15 to 20 percent of all kw-hrs generated. With maximum losses taken as 100 for a single large substation serving a large area, this chart shows progressively smaller losses are possible with smaller substations. Combination of all costs will determine optimum substation size.

VOLUME 138, NO. 25

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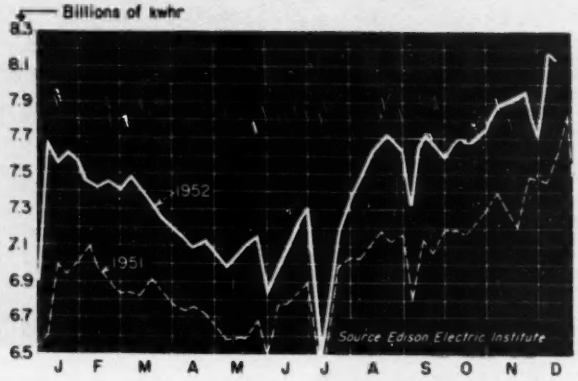

Output Week Ended Dec. 13—8,140,257,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Dec. 13	+6.2	+9.9	+5.5	+7.8	+8.1	+8.7	+4.8	+4.6	−9.0	+7.7
Dec. 6	+9.7	+14.7	+7.7	+11.7	+9.4	+13.6	+8.6	+9.3	−4.3	+9.3
Nov. 29	+3.0	+2.0	+0.1	+3.0	+5.1	+5.8	+5.7	+6.0	−4.5	+5.2

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	Oct.	69.7*	69.7	64.7
Capacity (Million Kw)	Oct.	79.70	78.78	74.68
Production (Billion Kwhr)	Oct.	34.82	33.38	32.34
Hydro		17.02	7.36	7.55
Fuel		27.80	26.02	24.89
Fuel Consumption				
Coal (Million Tons)	Oct.	9.92	8.82	9.59
Oil (Million Barrels)		7.16	6.03	5.46
Gas (Billion Cu Ft)		83.08	97.37	71.74
Sales (Billion Kwhr)	Sept	30.11	29.39	27.54
Residential		7.66	7.53	6.82
Commercial		5.37	5.46	4.89
Industrial		14.75	14.10	13.62
Other		2.33	2.30	2.22
Net Income Class A & B Companies ($ Million)	Oct.	53.67	73.12	65.47
Estimated Dec. 52 Peak (Million Kw)	Sept.	79.7	80.0	80.3
Kwhr per Residential Customer (12 Month Average)	Sept.	2,131	2,119	1,961
Revenue per Kwhr Residential Service (12 Month Average)	Sept.	2.77¢	2.77¢	2.83¢
Canadian Production (Billion Kwhr)	Sept.	4.99	4.97	4.41

Business Statistics

FRB Industrial Production Index †††	Nov.	230	231	220
Gross National Product Annual Rate ($ Billion)	3rd Qtr.	343.4	342.6	337.1
E. W. S Industry Production Index	Nov.	128.3	127.4	
ENR Construction Cost Index ††	Nov.	121.1	120.7	114.7
BLS Consumer's Price Index	Oct.	190.9	190.8	187.4
NEMA Insulation Materials Sales Index †	Oct.	559	531	559
NEMA Electric Appliance Sales Index †	Oct.	260	231	305
NEMA Household Refrig. Sales Index †	Oct.	122	136	113

*Estimated. † 1936=100 †† 1949=100 ††† 1937-39=100 (Unadjusted)

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THIS IS A 150 Kv ANTENNA ENTRANCE INSULATOR

This insulator is designed to carry an antenna lead through the roof of a transmitter tuning house to an antenna. It is used at an effective operating voltage of 150 kv, and is the largest insulator of this type ever built—requiring a porcelain dome 32″ in diameter, 30″ high. It is similar to the Lapp standard series of antenna entering insulators for the broadcast industry, but is something "special" indeed in size—Lapp's answer to a demand from the field for an insulator to be operated at a voltage considerably higher than previously encountered in broadcast practice.

This design is significant, in addition to its large size, for the ingenuity of its shielding provisions. The porcelain is protected against dielectric heating internally, opposite the flange, and externally, at the narrow top section.

Many suppliers of equipment to the electrical transmission, as well as radio industries, look to Lapp for engineering, design and production of special parts involving use of high-voltage or low-loss ceramics. They know, as do operators of transmission and distribution systems across the nation, that the name LAPP guarantees an extra margin of operating security. For, although *you can buy cheaper porcelain—you can't buy better porcelain*—than LAPP.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

THE ELECTRICAL WEEK

The Issue's News Highlights—Joint Congressional Committee on Atomic Power meets with industry groups to get their views on changing the McMahon Act. Changes might result in greater private participation in nuclear development.

House public works subcommittee report indicates Corps of Engineers and Interior use inconsistent cost accounting systems to justify their policies concerning federal power projects.

Commissioner C. A. Erdahl of Tacoma City Light is being considered for power post in new Republican Administration.

Off the Washington Wire—Duke Power and South Carolina E & G ask a Federal District Court to halt temporarily construction of 41-mile transmission line being built by Southeastern Power Administration which will take power from Clark Hill Dam on S. C.-Ga. line to system of Greenwood County Electric Power Commission.

Year-end changes at Depa include: John O'Nan of Duquesne Light is new chief of major equipment scheduling branch. Harold M. Stockton of Dallas P & L is new chief of projects and control branch.

From New England—In 30-year, $3-billion program, New England business-managed utilities are preparing to quadruple power supply of region by 1975. Since World War II, 1.75 million kw have gone into service. By 1955 the program's first decade will increase over 5 million kw, or 85%. Then will follow a continuing schedule of new construction to reach a total between 9 and 12 million kw by 1975. These utilities announce that not a single federally built and financed power-producing dam is operating in the six New England states. Public Service of New Hampshire buys Mutual Public Service Co of Goshen, N. H. . . . NEGEA NEWS makes it bow this month as a new house organ of electric and gas utilities under management of Negea Service Corp.

From West South Central—Missouri Utilities gets Arkansas PSC approval to sell properties in Paragould to the city.

From the Far West—Seattle City Light will begin drying-out operations on first of three 100,000-kva units at Ross hydro plant on Skagit River. Unit is expected to be on line after the first of the year . . . USBR signs its first contract with State of California, agreeing to furnish an ultimate load of 1,500 kw of Central Valley Project power to Deuel Vocational Institute, a facility of State Department of Corrections near Tracy.

Ellensburg, Wash., City Council signs new 20-year power contract, retroactive to October, with Bonneville Power Administration which results in a saving of $1,200 a month to the city . . . Kitsap County PUD expects to vote Dec. 24 on a resolution introduced by J. W. Bryan, Sr, newly elected chairman of PUD, which will strengthen his defense in an ouster suit filed against him by County Prosecutor John C. Merkel.

From Canada—Niagara Hydro-Electric Power Commission gets word from Ontario Hydro Commission that starting in 1953 it will be required to pay $38 per kw as compared with $31.80 a kw at present.

Dividends—Michigan G&E gets PSC approval to pay 3% stock dividend on Dec. 26 to stock of record Dec. 11.

Financial—Appalachian Electric Power gets West Virginia PSC approval to buy distribution system serving mining community of Riley in Logan County . . . Sierra Pacific Power gets FPC approval to sell $1.5 million bonds 3¾% due 1982 to four insurance firms.

Labor—Michigan's Governor Williams' fact-finding commission recommends 20¢ an hour wage increase for workers of Michigan G&E, retroactive to Aug. 15.

Rates—Cincinnati City Council Utilities Committee and Cincinnati G&E agree on an electric rate ordnance. It will be submitted to City Council on Dec. 24 . . . Delaware P&L gets PSC approval to keep in effect an increase in rates of $205,000 a year which were put in on Aug. 1 when company posted a $50,000 bond pending PSC decision . . . Commonwealth Edison files with Illinois Commerce Commission a rate schedule provision "freezing" resale of electricity by its customers. Only customers now engaged in practice will be allowed to resell.

Any move by GOP Congress to stifle expansion of REA, the co-ops, or federal power projects will bring strong opposition from co-ops, Walter Harrison, manager of Georgia Electric Membership Corp, tells annual meeting at Atlanta. Georgia PSC Chairman M. L. McWhorter declares that when public and private groups carry out their duties in a spirit of cooperation and understanding as REA and Georgia Power have done, result is far better than that which can be obtained by letting public power or authority undertake the entire job. That is why Georgia's REA program has been far more successful than the program in Tennessee, he says.

Four Democratic Congressmen express fear for TVA future. They are Tom Murray, Jere Cooper, and Albert Gore of Tennessee and Jamie Whitten of Mississippi. "Knowing the Republicans like I do we are in for trouble getting money for expansion of TVA." Murray says. Whitten declares Republicans "won't meet the issue head on. They will gradually choke it to death."

Congratulations—Connecticut River Watershed Council names E. R. Foster executive director . . . Georgia Electric Membership Corp elects D. Marshall Pollock president . . . A. G. Skinna, former head of Depa's construction expediting branch, joins Commonwealth Services Inc, as general consultant, specializing in electrical matters . . . Minneapolis-Honeywell Regulator Co elects Glenn E. Seidel vice president . . . Eta Kappa Nu Association gives its "outstanding young electrical engineer award" for 1952 to Dr John Van Nuys Granger of Stanford Research Institute of Stanford, Calif. Honorable mentions went to Gustav W. Staats and Edward O. Johnson.

THE ELECTRICAL WEEK

CONTINUED

Bonneville Regional Advisory Council gets reports from its Research Committee recommending use of revenue bonds to finance dams and transmission facilities in Columbia River basin while BPA's Paul Raver proposes power development be taken out of hands of federal government and given to a regional board elected or appointed by governors of affected states . . . **House Public Works subcommittee** recommends Corp of Engineers take over primary responsibility for nation's flood control program which should end feud with Department of Agriculture.

City of Jamestown gets NY PSC approval to up rates $321,500 annually for a two-year trial period beginning Jan. 1 . . . **Georgia Power** asks PSC approval to include fuel oil clause in rates schedule . . . **Georgia P&L** asks PSC approval to raise rates $149,572 annually . . . **Southern California Edison** asks PUC for $16 million a year rate hike . . . **Norwalk, Conn., Zoning Commission** hears plea by Connecticut L&P to build steam plant on Manresa Island off Norwalk. Pres Sherman Knapp says plant will not be a smoke or noise nuisance and it will bring the city $200,000 a year in taxes. Commission must make a decision before end of month . . . **Colorado Fuel & Iron Corp** has set up a wholly owned subsidiary to buy John A. Roebling's Sons Co, Trenton, N. J.

IN THE INDUSTRY

Drenching rains started falling on the coastal slopes in the Pacific Northwest some ten days ago. They came none too soon. On Dec. 13 the Columbia River flow was still near record lows. Natural flow at Grand Coulee Dam was within 1,000 cfs of the critical low. Bonneville flow was only 4,000 cfs above the same date of the worst season. So not all danger of a super-critical power shortage is gone, but executives of members of the Western Division of the Northwest Power Pool are relaxing.

Actually power suppliers and residents of the area, with a little help from the Defense Electric Power Administration, have already licked one power shortage this fall. As the critical season approached, Depa ordered a 10% reduction in firm power usage to be based on usage in 1951 (EW, Nov. 9, p 10). Then the power suppliers cut off all interruptible power and warned the people to conserve or else.

Weather Was Kind . . . But the fear that still lingered was of the growing loads of December. One big break was a change in the weather that made early December warmer than late November. On cold Nov. 24 the western group members of the power pool had an evening peak of 4,021,000 kw. On warm Dec. 10 the peak was only 3,738,000 kw. Bonneville Power Administration attributed 100,000 kw of the drop to the weather.

With their power supply threatened daily people of the area take a greater interest in the power situation than do those of any other area. When power was curtailed under the Depa order, unemployment resulted in the lumber and plywood industries. These idle workers then became critical of the vast amount of power used in aluminum smelting plants. The lumber men pointed out the relative low man hours of work per kwhr of electricity used.

Protests mounted when a new generator at the Rock Island Dam of Puget Sound Power & Light Co made it possible for the Aluminum Co of America to resume operations at a second potline at its Wenatchee, Wash., plant. The generator is one of six the Chelan Public Utility District is allowed to install at the dam under an agreement with Puget Sound. Alcoa had contracted with Chelan for the power long before the plant was finished. Depa hastened to point out that the Alcoa plant is affected by the firm power cut.

Raver Blasts Critics . . . Even BPA Administrator Paul J. Raver felt the heat enough to blast back, "I'm really dismayed by attacks on our great aluminum industry by our own Pacific Northwest people." He added, "We didn't hear that outcry in 1945 and 1946 when the government shut down these plants. Today I am criticized because I made firm power contracts to get those plants into operation."

In defense of BPA's 16 industrial contracts Raver declared, "I want to make it clear that we have no bigger firm power commitments to aluminum plants today than we had in 1944. Any expansion since that time has been based on interruptible power, and we have cut off our entire interruptible load, 365,000 kw, during the current shortage. Most of that comes out of aluminum production."

Federal Steam Power Plants? . . . The easy physical solution of the power problem is the construction of steam plants. But the private utilities don't want to build them. They can't be operated in competition with the tax-free, federal hydro projects. Of course somebody else can build them, and Senator-elect Henry M. Jackson, Dem, Wash., has that somebody in mind. He has called for early action by Congress toward construction of steam plants in the Northwest. As a Congressman he introduced such a bill but got nowhere with it. He is likely to reintroduce his bill in the Senate. What will happen to it? Who knows?

TECHNICAL NOTES

ARCHER E. KNOWLTON

(Items adapted from identified papers of ASME 1952 annual meeting)

Cyclohexylamine treatment of feedwater has effected marked decrease in rates of contamination by heat exchanger tube non-ferrous alloys, preventing entirely iron contamination from Type 316 stainless steel. (102)

Smoke abatement dates back to 1306 when Edward I prohibited the use of "sea coal" in furnaces and appointed a commission to enforce the ban. (70)

Air pollution control is hampered by the absence of standards for sampling and analyzing the atmosphere to determine objectionable content. (70)

Swiss gas turbines reputedly have had little trouble from ash deposits on the blades even after 3000 hours on fuel oil. (147)

Pulsation of a certain pulse-jet form of pulverized coal gasifier is inherently 80 to 100 cycles per sec. The action automatically opens the valves to admit more fuel. (102)

Federal Atomic Policy Up for Review

Conferences between Joint Congressional Committee and industry groups are prelude to hearings on private industry's role in nuclear development field.

The Joint Congressional Committee on Atomic Energy has just concluded a series of confidential conferences with electric utility and other industry groups, scientists, lawyers, and government officials. Objective of the confabs apparently was to find the answer to a big question: What is holding up atomic power?

Informal Talks . . . The informal discussions started in September and continued through the following two months but there was no public notice of these sessions until mid-December, when the committee produced a report, "Atomic Power and Private Enterprise." The conferences clearly were another in a series of steps preparatory to full-dress hearings by the committee early in '53.

First of these moves came last summer when committee members advised Atomic Energy Commission they felt it was time to review the Atomic Energy (McMahon) Act of 1946 and its administration by the commission. The recent conferences on power indicate the forthcoming hearings will concern atomic power possibilities and private industry's role in that field. Start of the committee hearings awaits reorganization of Congress. The committee refused to identify specifically what companies took part in the recent power talks. But the report makes clear that these included representatives of the five industrial teams now engaged in making power studies under AEC auspices, interested electrical equipment manufacturers, and makers of other products for the atomic energy program. Government representatives included spokesmen for AEC and the armed services.

Problems Discussed . . . The discussions produced no formal recommendations by the committee. Instead the committeemen heard the viewpoints and recommendations, many of them conflicting, of the business and government groups. Here are some of the major problems discussed:

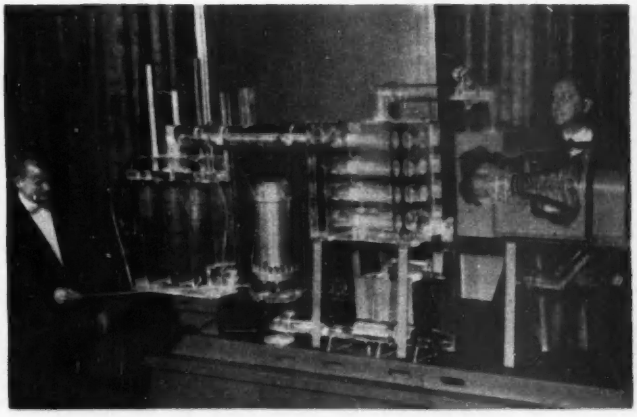
1. What kind of atomic power plants should be built? One group viewed any kind of plant capable of driving a generator as a successful atomic power plant. Another group held a successful plant should produce electric power at a cost competitive with conventionally-fueled power plants—nothing less than 150,000 kw at a cost of 5 to 8¢ per kwh.

Federal Assistance . . . There is no evidence that any power reactor would be technically feasible today without some kind of federal assistance. Simplest solution suggested is a dual-purpose system, capable of producing both power and fissionable materials, the latter to be sold to the government to insure competitive power cost.

2. Who should develop the plants? Some individuals, including equipment and utility company officials, contend AEC should assume responsibility to carry out the development through the pilot plant, or prototype plant, stages. This brought up the question of whether or not AEC should undertake development with its own personnel. If not, the selection of contractors would raise the problem of giving unfair advantages to the chosen contracting firms.

Who Should Pay Bill? Utility men divided as to who should bear developmental costs. One group was willing to shoulder costs up to $10 million to $15 million, but considered expenditure of $100 million or more as "unreasonable." Two other groups felt the industry had failed to meet its responsibilities in hydroelectric development and had paid a high price for that failure. They placed atomic power development in the same category. But they feel the job is beyond the ability of any single company. So they are trying to develop new company groups, within restrictions imposed by the Securities and Exchange Commission and the Justice Department, which can take on the developmental job.

Equipment and chemicals producers are willing to provide manage-



Design for Power Plant of Future?

Westinghouse Electric Corp displayed a model of its concept of an atomic power plant at the recent Congress of American Industry in New York. Pointing out the features of the model are C. H. Weaver (left) and Dr W. E. Shoup of the company's Atomic Power Division. Columns at the extreme left represent the nuclear reactor which generates heat from splitting atoms. Control rods extend from top of the reactor. Water circulates through square boiler toward the center of the unit. Steam produced there drives the generator.

ment and manpower for specialized atomic power uses—electric power, propulsion, and more dramatic uses.

3. Why is there no plant in existence?

So far there has been inadequate scientific and engineering data to solve critical problems relating to heat transfer, metallurgy, fuel handling and the like. There were high hopes for the power-breeder project started in 1947 at the Knolls Atomic Power Laboratory, but this was stopped by AEC in 1950 because of costs and military considerations. Both industry and government have been given pause by the estimated cost of the first full-scale dual-purpose plant—$50 million or more. And a pilot plant probably will cost about a fifth as much.

Utility Stockholders Reject Offer to Settle Judgment

Settlement of one portion of a $5,393,576 judgment favoring the Iowa Southern Utilities Co was held in abeyance at Centerville, Iowa, Dec. 15 when the attorney for 14 stockholders declined to accept a $150,000 offer of H. R. Bechtel, Davenport, Iowa, banker who was one of the three defendants.

Bechtel, and the estates of George M. Bechtel and J. Ross Lee were named jointly in an Iowa Supreme Court judgment issued after stockholders asserted the Bechtels and Lee acted fraudulently in the purchase of a number of small utilities and subsequent sale of the utilities to Iowa Southern. The defendants were owners of all of the common stock of ISU at the time of the purchases and sales.

H. R. Bechtel offered to settle his liability of the judgment for $100,000 cash and set Jan. 1 as the date by which the offer should be accepted. He later raised his offer to $150,000.

Attorneys representing the complaining stockholders declined to accept the offer and the Iowa District Court held the case in abeyance. Attorney for the stockholders has indicated he would begin proceedings to collect the judgment.

The judge hearing the case told attorneys to continue negotiations and indicated he would approve any settlement agreeable to both parties. Directors of Iowa Southern must approve any settlement before it can be accepted.

Here is a comparison of annual power charges as estimated by Corps of Engineers and by SPA:

Project	Corps of Engineers	SPA
Denison		
2 UNITS	$970,865	$583,895
3 UNITS	1,219,865	739,152
Norfork: 2 UNITS	593,000	558,075
Narrows: 2 UNITS	308,500	155,706
Bull Shoals		
4 UNITS	2,024,500	1,306,177
6 UNITS	2,274,500	1,549,467
Fort Gibson		
4 UNITS	1,102,300	544,095
6 UNITS	1,323,980	679,245
Tenkiller Ferry: 2 UNITS	706,760	352,050
Whitney: 2 UNITS	530,700	267,895
Blakely Mountain: 2 UNITS	1,076,800	572,133
Table Rock		
2 UNITS	2,702,000	1,294,000
3 UNITS	2,856,000	1,365,113
Keystone: 3 UNITS	1,600,000	319,750
Dardanelle: 4 UNITS	2,300,000	932,500
Short Mountain: 4 UNITS	3,033,000	771,000

How Are the Costs Figured?

House sub-group reports dual system of accounting is used on federal projects. It suggests some changes

Inconsistent accounting procedures were used by government agencies to figure the selling price of power produced at federal projects, it was disclosed in a House public works subcommittee report filed Dec. 19.

In vivid detail, the subcommittee to study civil works describes a dual bookkeeping system Interior used in marketing power from hydroelectric projects built by the Army Corps of Engineers. The report, itself, deals with methods used in allocating the investment costs to the various functions of multi-purpose water projects.

This is one of a series of reports being issued by the subcommittee headed by Democratic Rep Robert E. Jones, Jr, of Alabama. Top Republican member on the subcommittee is George A. Dondero of Michigan, who is slated to head the full Public Works Committee in the next Congress. It would seem probable that recommendations in the report will be favorably considered by the 83rd Congress.

More than ten pages of the 30-page report are devoted to an analysis of cost allocations involving power at three projects in the Cumberland River area and 12 projects in the Southwest.

These analyses show:

- One set of cost allocations is used in justifying multi-purpose projects before Congress, but an entirely different set is used in figuring the rates at which power from these projects is sold.
- In the case of three Cumberland River dams, the Corps of Engineers figures the annual power benefits are $11.2 million and the annual cost of power from these projects is $4.9 million. Yet Interior has concluded a contract which provides power revenues from these dams of only $3.5 million a year.
- Although the Flood Control Act of 1944 requires approval of Federal Power Commission in fixing rates on the Cumberland River projects, a

"BOB" JONES: The agencies have not been consistently diligent

marketing contract has been in effect for four years without that approval.

• In the case of 12 Southwestern projects, the constructing agency figures the annual power charges are $16.9 million and has used this figure in obtaining appropriations. Yet for power marketing purposes, Southwestern Power Administration, an Interior agency, figures annual power charges are only $7.7 million.

• SPA used five different cost allocation methods in ascertaining power charges on the 12 projects. Certain costs were allocated to purposes for which there appears to be no legal authority.

• Annual charges developed indicate that SPA can justify power rates that are less than one-half of those that would appear sound based on methods advocated by the Corps of Engineers, which built the projects.

Although the subcommittee does not consider extended criticism a part of its task, it warns:

"The absence of such extended and detailed criticism should not be taken by the agencies as any condoning of their lapses . . ."

The group merely points out that the examples, cited "should indicate clearly that the Department of Interior, the Corps of Engineers and the Federal Power Commission have not been consistently diligent, sound or objective in their actions involving allocation of cost problems."

These agencies, said the committee, should recognize they are a part of the administrative machine of a single government "and all have a responsibility to the general taxpayer as well as to special groups."

Changes Suggested . . . To correct misleading procedures now being used, the subcommittee recommends:

1. All costs of water-resource projects should be allocated so that each authorized purpose of the project will bear its own fair share of these costs and share equitably in economies resulting from use of a multi-purpose project.

2. The constructing agency should make original cost allocations for the various functions and the other agencies concerned should comment on these allocations.

3. Bureau of the Budget should coordinate these allocations both in the tentative and final form.

4. All reports to Congress recommending authorization of such projects should contain a full report on cost allocations.

5. Congress should be fully informed of changes in allocations.

6. Final allocations of capital cost should be made only upon completion of construction when all investment costs are known.

Fish Story at Long Island Lighting Power Plant

An extraordinarily good run of herring in Long Island Sound proved to be a nuisance to Long Island Lighting Co early this month. For about a week millions of the fish took haven at the company's Glenwood Landing Plant and got themselves enmeshed in screens protecting the plant's intake tunnels. Workmen were kept busy removing the fish from the screens (left) and loading them into trucks to be carted away (right). It cost the utility about $700 a day to get rid of the tons of fish in the big haul.

Only damage suffered by the plant was in broken intake screens which were repaired as soon as rips occurred. Operations at the 300,000-kw station were not limited.

St. Lawrence Hearings Near End

Supporters of N. Y. development plan present testimony before FPC examiner. Opponents to offer few witnesses

An attempt to get the Federal Power Commission to write a preference provision in any license granted for the St. Lawrence power project highlighted hearings on that project last week.

Power Authority of the State of New York is seeking an FPC license to build and operate the 940,000 kw U. S. portion of the power project. (EW Dec. 15, p 90). Hearings on the application appeared to be nearing an end. However, it appeared unlikely that any decision would be reached before mid-January.

Want Assurances . . . Supporting the application, but with qualifications, were such groups as the American Public Power Association and the National Rural Electric Cooperative Association. Both these groups wanted some provision written in the license which would assure a fair share of the power would be sold to public bodies such as municipal utilities and rural electric cooperatives.

Clyde Ellis, NRECA executive manager, asked that the commission require the licensee to "make such arrangements for transmission and delivery, including the acquisition and construction of transmission facilities, as may be necessary in order to make the power and energy available to public bodies and cooperatives in wholesale quantities for sale on fair and reasonable terms and conditions."

While the public power representatives made a vigorous presentation, they could point to no FPC precedent for such a preference provision. In the past, the commission has held the view that the Federal Power Act precludes them from inserting a preference clause in licenses for hydroelectric projects.

Little Opposition . . . Surprisingly little opposition to the project developed at hearings as they went into their second week before a FPC examiner.

What little opposition there is comes from coal, railroad, and East Coast and Gulf port interests who claim that the power project at the proposed seaway project would be detrimental to them. Several organizations representing these interests are intervening in the hearings as outright opponents of the New York application. They are expected to offer two or three witnesses to present testimony on their behalf.

For N. Y. Plan . . . But supporters of the power authority application have rolled out the big guns. Evidence has been introduced which indicates the application has the full backing of the federal government. Representatives of the Canadian government and especially the Ontario Power Commission have appeared to support vigorously the New York authority.

Erdahl Believed in Line for Federal Power Post

C. A. Erdahl, Commissioner of Public Utilities at Tacoma, Wash., is believed to be under consideration for an important power position in the new Republican Administration. He now is being given the type of investigation which customarily precedes a federal appointment, with FBI agents reportedly contacting his friends.

Most logical position for Erdahl to fill would be that of Bonneville Power Administrator, a position now held by Paul J. Raver. As chairman of the Utilities Conference Committee, Erdahl has been in close touch with the Pacific Northwest power situation in recent years. Furthermore, he is in the unique position of being acceptable to both the private power and the public power people. Although himself a public power official, Erdahl often has expressed fear of the federal government controlling the power supply, a fear he shares particularly with private power.

His friends believe, however, that the Tacoma man is being considered for a post at Washington, D. C., probably in the Department of the Interior. Gov Douglas McKay of Oregon, who will be Secretary of the Interior, is known to have a high opinion of him. Suggested positions include that of assistant secretary in the Bureau of Reclamation or on the Federal Power Commission. Erdahl has conferred recently with McKay and high government officials. He will have to look for a job next June, when Tacoma goes under a city-manager plan which calls for appointment of a director of public utilities by a public utility board which in turn would be appointed by the mayor with confirmation by the city council. Erdahl also would be a logical candidate for this position.

Investigation Asked

Magnuson calls on McGranery to probe activities of utilities blocking Puget-PUD deal

The Justice Department has been asked to investigate the activities of private utilities which are blocking the $100-million sale of Puget Sound Power & Light Co to six Washington state PUD's.

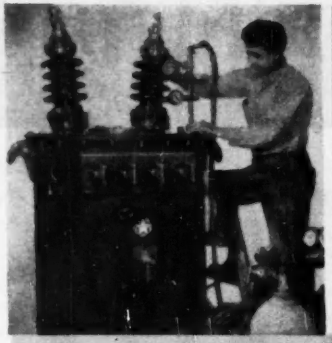
The request was made by Sen Warren Magnuson, (D-Wash.), on behalf of the districts, Puget Sound P&L, and others.

Anti-Trust Law Violations . . . In a letter to Attorney General James McGranery, the senator said the groups "allege that Washington Water Power Co and other private utilities across the country started a series of activities designed to block the sale, which activities they feel constitute a violation of the anti-trust laws and perhaps the Federal Corrupt Practices Act."

Previously a new suit was filed in Chelan County Superior Court at Wenatchee by Puget Sound P&L against Washington Water Power and its directors, two Puget Sound stockholders and two commissioners of Kitsap County PUD.

The complaint asserted that Washington Water Power was involved in legal action taken by the two minority stockholders, who brought an action in a Massachusetts court to block the sale. The temporary restraining order these stockholders secured has since been vacated but a legal action now pending in Kitsap County Superior Court at Port Orchard, Wash., currently blocks the sale (EW, Dec. 15, p 117).

The Kitsap PUD commissioners presumably were named in the suit because of their action in breaking what McLaughlin terms a "binding contract" for the purchase.



A charge of Freon gas is released inside the transformer through the cover, placing the unit under positive gas pressure.

The inlet hose of the Freon leak detector is passed around all joints of the tank cover, bushings and handhole cover. If any gas leaks through the joint, it is drawn into the leak detector.

Leak detector has a shielded flame which changes its color when Freon gas is present, thus indicating a leak. If a leak is detected, the faulty seal is corrected and retested.

"When a POLE STAR transformer passes the Leak Detector Test...

I know it's sealed!"

says **Frank Osiecki**
POLE STAR FINISHER

Prior to shipment each intermediate-size Pole Star Transformer (167 through 500 Kva) is given a reliable leak detector test to make certain that the transformer is properly sealed when it leaves the factory.

This is another one of the many extra steps in a carefully planned manufacturing procedure. It is another example of the quality control that Pennsylvania builds into all Pole Star transformers.

PENNSYLVANIA TRANSFORMER COMPANY
A McGraw Electric Company Division
CANONSBURG, PENNSYLVANIA • ***Greater Pittsburgh District***

Pole Star transformers are available in all standard sizes from 3 Kva through 500 Kva, and in voltages up through 43.8 Kv.

new tap changer design

KEEPS CONTACTS AUTOMATICALLY SELF-ALIGNED

FOR ANY CONDITION A TAP CHANGER runs cool with less wear and less deterioration when it meets these requirements:

1. **Contact members flexible and self-aligning.**
2. **Equal and positive contact pressure.**
3. **Magnetic forces utilized to increase contact pressure.**
4. **One single established current path per contact.**
5. **Strong wiping action to clean contact thoroughly when tap positions are changed.**

This new Allis-Chalmers tap changer combines all five of these requirements. A design like this results in improved, cooler, carbon-free operating performance.

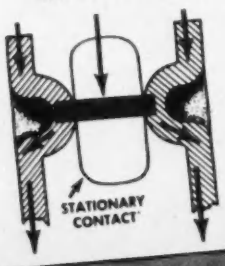
A positive flow path established under high unit pressure by a round point on a flat contact surface is the basic design principle of this new tap changer. High unit pressure promotes low contact resistance and deters heating and growth of dangerous carbon.

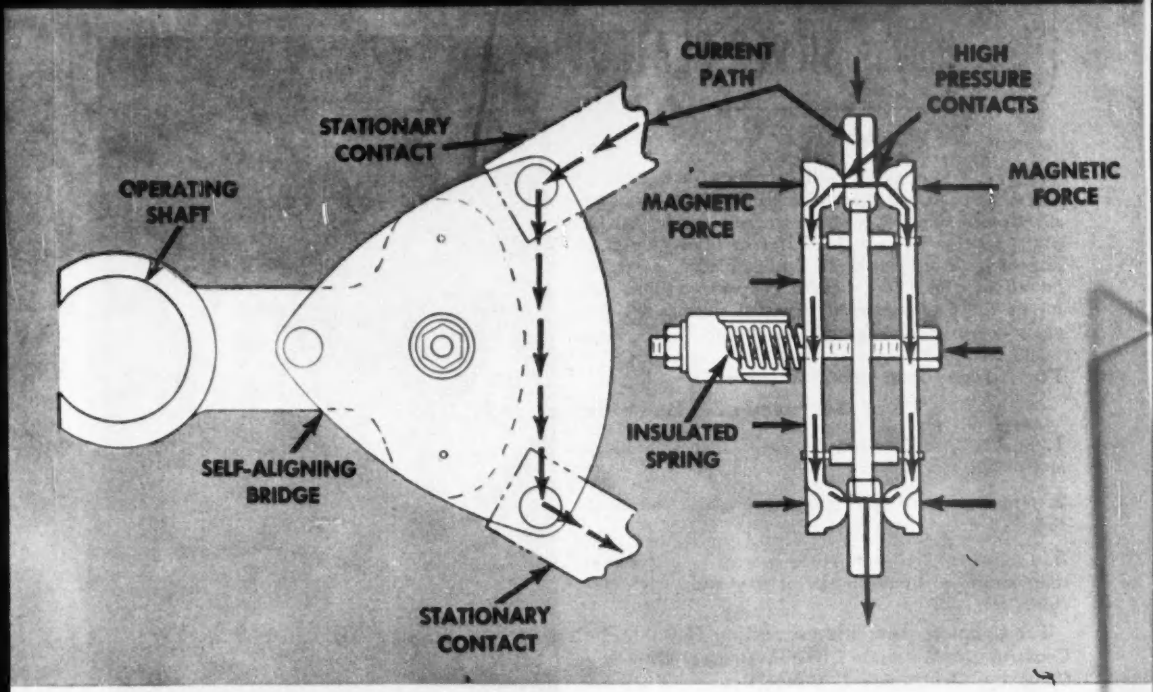
MAGNETIC FORCES UTILIZED

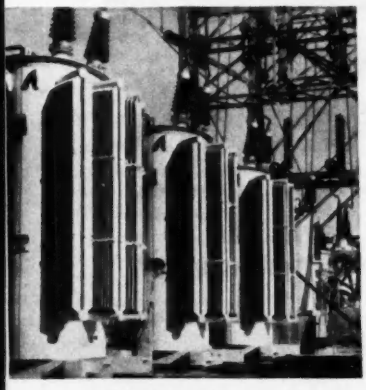
Parallel plates form movable contact bridge. Magnetic forces are set up as the result of the parallel flow of current in the bridge. These forces prevent "throw open" action when a short circuit occurs.

Get the complete story. Send for the illustrated technical sheet further explaining this new tap changer. Allis-Chalmers, Milwaukee 1, Wisconsin.

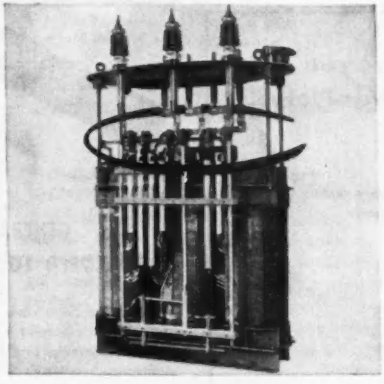
YOU CAN SEE from this diagram how the rounded point on a flat surface establishes one current path per contact. This construction assures high contact pressure. The reason is that both magnetic and applied forces are concentrated at this single point.



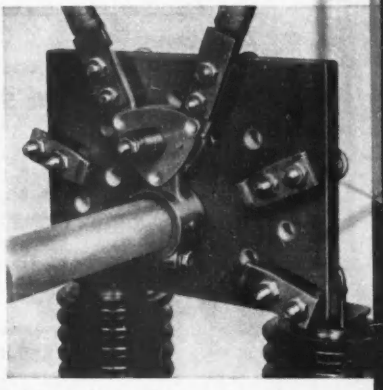




Leading utilities find this new tap changer the answer to improved tap changer performance. Flexible action maintains equal pressure and continuous alignment.



Mounted above the core and coil assembly, this new tap changer is easily inspected through the cover manholes. Tap positions are changed in all phases simultaneously.

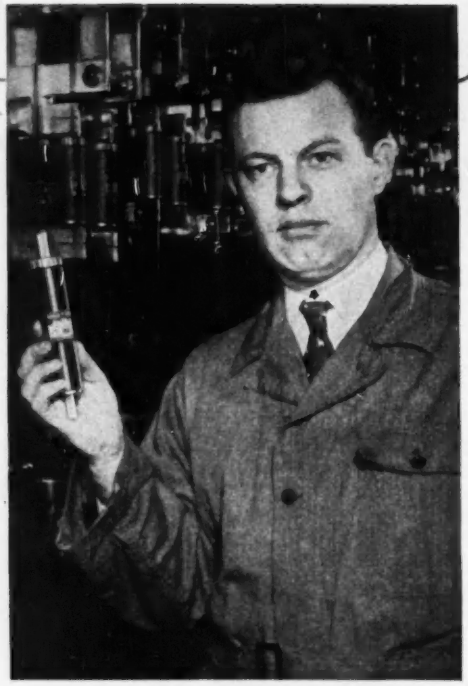


This view shows the moving contact member bridging the stationary tap lead connections. By keeping sharp edges to a minimum, engineers reduced voltage stresses.

A-3756

ALLIS-CHALMERS

"No Wonder These G-E Fuses Are So Accurate ...they're SILVER-PLATED!"



"You can't beat silver as a conductor of electricity. That's why General Electric's new renewable fuse with silver-plated contact surfaces appeals to me. Silver-plating helps keep the ferrules or blades on G-E renewable fuses from heating up as blades or ferrules on ordinary fuses do because of copper oxidation. This means fewer replacements, fewer shutdowns for my company—fewer emergency calls for me."

You'll like these other features of G-E renewable fuses too

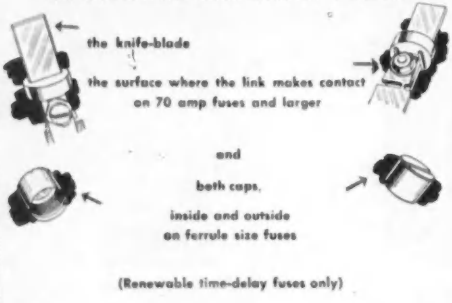
1. Simple three-piece construction of both knife-blade and ferrule types.

2. Newly designed links give accurate and consistent time-delay.

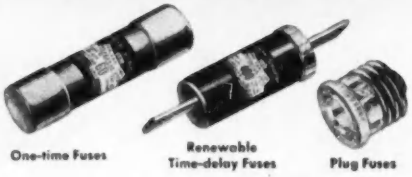
3. Ribbed cap on knife-blade sizes gives better grip than knurling. You can tell at a glance which end comes off.

For complete data, address Section D49A-1227 Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

At no extra cost to you
General Electric Silver-Plates


the knife-blade
the surface where the link makes contact on 70 amp fuses and larger
and
both caps,
inside and outside
on ferrule size fuses

(Renewable time-delay fuses only)



GENERAL ELECTRIC FUSES DEVELOPED TO PROTECT G-E EQUIPMENT

The G-E fuses available to you are the same high-quality fuses that were developed to protect and maintain top performance of apparatus and equipment bearing the General Electric nameplate.

General Electric makes all standard fuse ratings; all G-E fuses are listed by Underwriters' Laboratories, Inc.

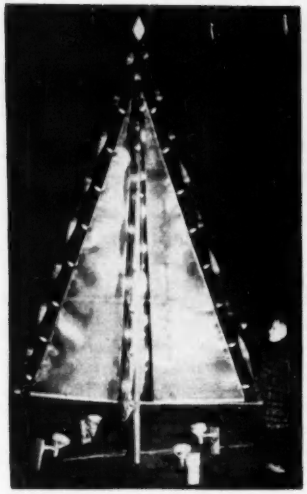
You can put your confidence in—

GENERAL ELECTRIC

Christmas Trees In Light . . .

. . . at Rockefeller Center

. . . at Nela Park



AT CLEVELAND display, GE set up stylized sheet-metal Christmas tree showing ways for amateur decorators to create Yule decorations

HUGE TREE at Rockefeller Center in New York City sparkles with 5,000 fire-fly lights and 600 9-in. illuminated plastic globes of red, yellow, and white. The lighting ceremony was held Dec. 12 and 100 Rockefeller Center Choristers added song to festivities

POWER BRIEFS

● Erection of structural steel has begun at Ohio Power Co's new distribution substation near Middlebranch. The station will replace one built in 1936 and is expected to be in operation next year. When it is completed voltages in the distribution area will be increased from 4 kv to 12 kv.

● Ground was broken last month for a new generating plant being constructed by Central Power & Light Co at Corpus Christi, Tex. The plant will be named for Pres Lon C. Hill.

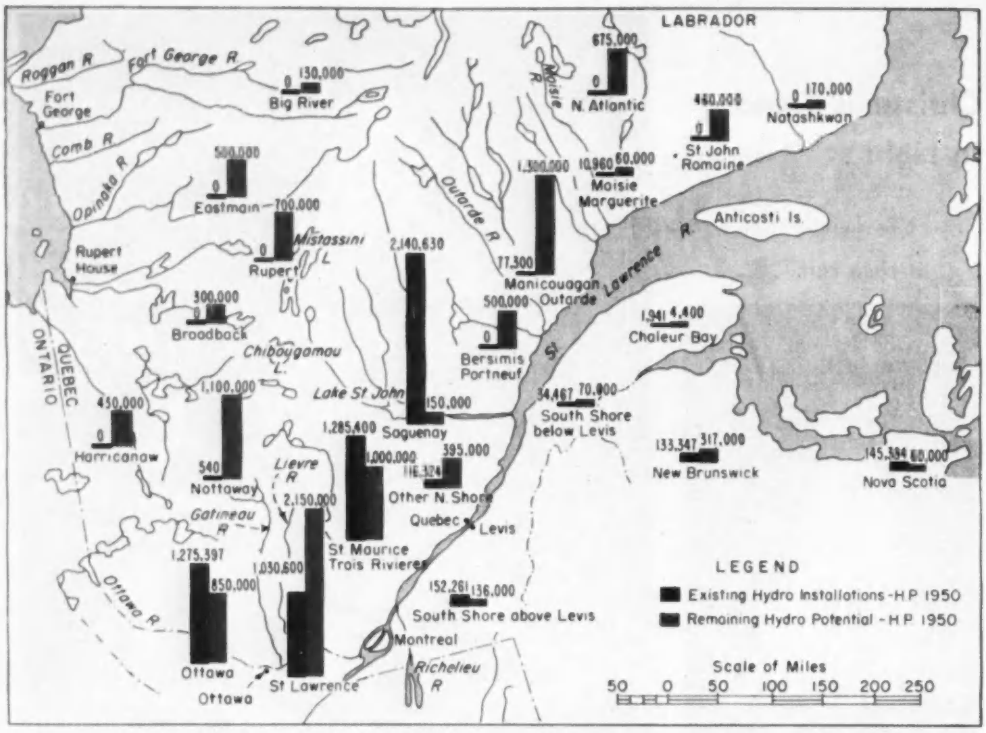
● Consumers Power Co has placed in service a second 85,000-kw steam electric unit at its Justin R. Whiting Plant on Lake Erie above Monroe, Mich. A third unit of 106,000 kw capacity is under construction at the plant and will go on the line in 1953. Consumers Power's total capacity is now 1,222,000 kw, about double that of ten years ago.

● Austria plans to develop the hydroelectric potential of the Salzach River in Styria. A chain of power stations will be built with a total capacity of about 200,000 kw. The largest plant, rated at 120,000 kw, will be built at Schwarzach. Other stations will be located at St. Johannim-in-Pongau, Bischofshofen, and in the Werfen or Golling area.

● British Electricity Authority plans to build a wind power generator on a noted hill in Wales has run into stiff local opposition. At a hearing on the purchase of a site for the windmill on Mynydd Annelwog a spokesman for the Council for the Preservation of Rural Wales declared: "To allow the development and vulgarization of the mountain would be barbarous indeed." He added that the 500-ft hill was still "God-made" and that a windmill would introduce a restlessness alien to its peace.

● City Council at Dover, Ohio, has rejected an offer by Ohio Power Co to survey the local municipal power plant to determine whether the private utility could offer stand-by service. Instead the councilmen decided to proceed with plans to obtain a $1.5 million generating unit for the municipal plant.

● About 900 employees of Long Island Lighting Co have moved out to Hicksville with the opening of the first group of buildings of the utility's new central service headquarters there. Departments involved include electric operating general office, line construction and maintenance departments, emergency service, training division, safety and stores departments.



TOTAL HYDRO POWER, industrial and utility, is shown in black, was 6,131,597 hp on Jan 1, 1950. Estimated commercial potential of remaining water power was 11,000,000 hp at this date. Plans call for development of half this remaining potential in near future

Canadian Systems Meet a Challenge

Suppliers add capacity, reach out for hydro sites, and seek latest engineering techniques to supply demands of industries

Canada from East to West is stirring. Electrical demands are rising. Plans for meeting them by system expansion dominate what a visiting engineering editor uncovers as he seeks the picture and the pattern. Minerals and ores lead in U. S. interest as is manifested by the financial pages of American papers. In Canada the activity is unmistakable. It extends from the iron deposits of Labrador to the uranium and titanium of middle Canada and on to the aluminum operations along the Pacific Coast and the Alaska border.

In particular the new and accelerated areas of Eastern Canada are conscious of the certainty that they are going to need more power. They are going to acquire it in due course. They need it not only for minerals and metals. Paper, chemicals, synthetics, and other industries as well are expanding and multiplying.

Consequently it is not surprising that power suppliers are reaching further outward for water power sources to develop while at the same time they are doing as much as can be done in Ontario to develop the newly released Niagara River power and to plan for the construction of the St. Lawrence project. This latter has been marking time until the stalemate is cleared by some wholesome action south of the border.

Hydro Electric Power Commission of Ontario has built two steam plants (Windsor and Toronto) but is unlikely to build any others right away if the power of the two rivers becomes available on the hoped-for schedule. What HEPC will do after those powers are absorbed is uncertain, but the day of abundance of feasible hydro at points in the province other than along the Niagara and St. Lawrence Rivers has largely passed.

Roughly the provincial system has a dozen or so outlying potential hydros considered to be within economic reach. These average something like 100,000 kw each and in total hardly amount to more than 1 million kw. Niagara and the St. Lawrence with their combined 9 million kw have been developed to only approximately 40% of the potential.

Meanwhile the Sir Adam Beck-Niagara generating station has been started and with it a pair of 45 ft diameter tunnels 5½ miles long under the city of Niagara Falls, Ontario (EW, May 26, p 15). The tunnels

plus a 2½-mile canal will deliver the sanctioned 2,000 sec ft at 300 foot-head to the 900,000 kw of capacity at the new hydro plant.

House Heating Load not Sought . . . But there is no discernible disposition here, or in Quebec either, to look at the prospective adequacy of "white coal" as warranting a program of soliciting such heavy loads as electric house heating. In neither province is there anything much more than reluctance to take on such a load in such a climate. One thing they mention on the negative side is the winter decline in hydro output as the rivers freeze up just about the time the house-heating demand would be the greatest. A not uncommon figure for coal for house-heating is $27 a ton, but the electrical energy and demand charges would presumably have to approximate a 2¢ average rate. Representation by the power distributors in discussions before the provincial regulatory authorities were largely that the annual cost to the customer for electric heating would be too uneconomical by comparison.

Canada, too, has its eye toward industrial expansion. And the sentiment prevails that the power in sight should be husbanded for industrial use at rates beneficial to the whole populace in terms of over national economy. In brief, electric house heating is being sought by some groups, but encouragement is distinctly withheld by the utilities. This attitude apparently has the blessing of the regulatory authorities and the provincial administrations in both Ontario and Quebec.

DOUBLE EXISTING CAPACITY of Ontario Hydro, 900,000 kw from the 12 units of Sir Adam Beck Station No 2 will ease the province's critical power shortage

Quebec Hydro Expanding . . . Quebec Hydro Electric Commission has been modernizing and expanding its system ever since its foundation in 1944. A battery of new distribution substations has been built to tap the 120-kv ring into which the Beauharnois and Shawinigan lines feed the major bulk supplies for the system. In mid-September the commission energized the new Montreal North substation of 240,000 kva capacity. Details will be given in a subsequent technical article. Here are a few of its outstanding features:

1. The single-tank, three-phase, 120-kv circuit breakers.

2. The use of racks and trays for control wiring to avoid a 2-ft thick concrete floor in the control house to carry conduit.

3. Some use of aluminum conduit outdoors at the station.

One of the several new 12-kv stations will be completely oilless as to transformers, regulators, and circuit breakers.

Expansion of Hydro-Quebec into remote areas of the province where electricity was not available has developed considerably. The Quebec Government has announced this month that a $100-million project on the Bersimis River—described as the largest single hydroelectric project ever undertaken in Quebec—will be started early in 1953 to serve the expanding industrial needs of a vast eastern Quebec area.

Gaspe Mining Fields Will Get Power . . . Power from the Bersimis development will also be made available to newly found Gaspe mining fields, through a 31½ miles submarine, high-tension, 4-cable crossing under the St. Lawrence River, between the Manecouagan Peninsula on the North Shore and Les Boules, on the South Shore. At the same time, construction is progressing rapidly on a second generating plant destined to supply the progressive mining district in northwestern Quebec.

Quebec Hydro's principal service region at present is the compact Montreal area, although it does have a generating station on the upper Ottawa River, supplying power to the mining area around Noranda. Expansion of Quebec Hydro is in regions beyond the territories of the privately owned companies, and the successful co-existence of private and public owner-

ship, under an apparent policy of live-and-let-live, is evidenced by the extensive power interchange agreements now in effect to the benefit of both parties.

Shifting to engineering and technical matters Eastern Canada is found to be energetically engaged in development and research. Problems are recognized and not allowed to build up to system snafus.

Shawinigan Works with Aluminum Company . . . On the Shawinigan system, owing to the heavy interchange of power with the Saguenay River system of the Aluminum Co. which is destined to increase shortly, larger conductors have recently been installed on the two lines from Aluminum's Ile Maligne plant to Shawinigan's Quebec City Terminal Station and the voltage has been raised to 220 kv. This will provide a much stronger tie between the two systems and will work out advantageously for both of the companies.

Continual studies are also being made by Shawinigan on the joints in the conductors of high voltage transmission lines. New methods also are being tried and devised to detect faulty connections and ensure the best available joints being used in future line construction.

Along with these and many similar instances of forceful analysis and ingenuity can be mentioned a disposition to "go foreign" if necessary to cash in on the advances being introduced by European manufacturers. Possible price advantage is reputed to be less a factor than willingness to take a risk with a relatively untried innovation for the sake of the stimulus it imposes on manufacturers back home. That is not a wholly new tendency in Canada because the first air-operated breakers and the first gas-pressure relays on this continent were applied there. This spirit of pioneering never died; on the contrary, it is undergoing a new spurt.

Gatineau Improves Turbine Efficiency . . . Gatineau Power is engaged in a program of improving the efficiency of some of its older Francis turbines by modifications to the cast steel runners. These turbines showed good efficiencies (about 92% maximum) in the original acceptance tests, but this is appreciably lower than the performance possible with the best of modern designs.

On the recommendation of the Canadian manufacturer of these turbines the discharge edges of the runner blades were modified by welded extensions to change the distribution of the outflow area and to improve the flow conditions at the runner discharge. An index test of one unit already completed shows a gain of approximately 1¼% in efficiency without any capacity reduction. The cost of the modification is small in comparison with the value of the additional power obtained from the available water supply.

One of the municipal systems has a few unit substations, but the enthusiasm for them is not too strong. One of the units has been split and a second bus installed. This accommodates a second transformer at only 20% in additional outlay. It is not felt that this trick sacrifices anything substantial in reliability. Meanwhile gum-filled units are being changed to "air-filled", a switch that is feasible because more dependable insulators have meanwhile been made available by the manufacturers.

Ontario Hydro Uses New Cutout . . . Reverting to the Ontario system there is a new cutout practice which rested on the development of an under-arm design by three Canadian manufacturers. It has no doors, has a dropout indication, and avoids difficulties with birds or ice. The lineman can trip it before he reaches the transformer area of the pole. Pole mounting of transformers has not been adopted. Instead, the transformers are assembled with arrester and cutout on the arm which is then lifted as a whole to the bolting-on position.

Restressing of reinforced concrete has been under intensive study with dozens of other explorations and developments in the large HEPC laboratory. Ultrasonics has been used extensively to confirm the goodness or poorness of concrete even to testing the condition of a dam face poured in 1914. In one instance some 50,000 readings were taken over the face to base a decision as to the scope and depth of a resurfacing repair. Incidentally, the Toronto municipal system is still making concrete poles.

New operating apparatus is being developed in the HEPC laboratories for the generating stations to facilitate unattended functioning in some cases and in others to give the operators better operating guidance.

Engineering Enough For Export . . . Not all the engineering done in Canada is applied on home systems,—some is exported for cultivation on power systems abroad. Prominent in this activity is Canadian-Brazilian Services, Ltd, providing engineering and purchasing services for the subsidiary operating companies of the Brazilian Traction, Light & Power Co, Ltd. Major projects under way will present plans and schedules add approximately 750,000 kw by 1956.

Activity at present is centered on the early completion of an underground hydroelectric plant of 330 Mw capacity. This plant will use water provided by the Paraiba-Pirai Diversion Project which, by a pumping lift of 150 ft from rivers flowing back of the coastal plateau north of Rio de Janeiro. The project as a whole is complex, but it is substantiated by the presence in the Rio de Janeiro-Sao Paulo area where the companies operate of nearly two-thirds of the industrial activity of Brazil.

CEI to Add 4 Substations in Lake County by 1954

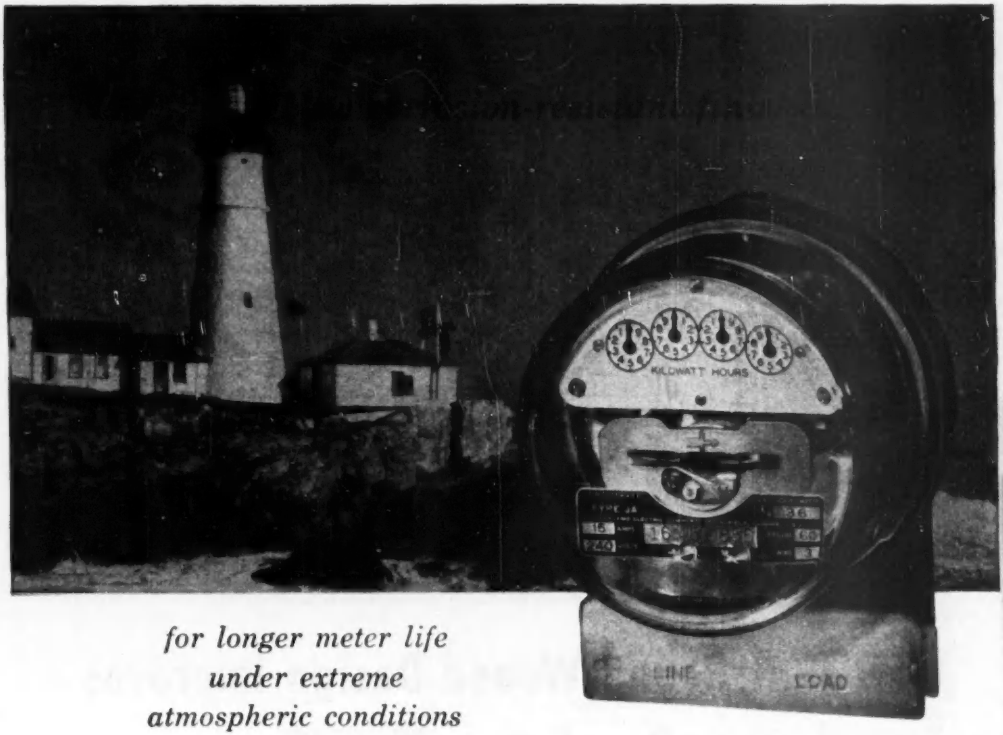
Cleveland Electric Illuminating Co will add four new substations in Lake County within the next two years at a total cost of more than $2.8 million.

The Lake County area, whose western section is growing faster than any other section of northeastern Ohio, has been aggressively promoted by CEI's industrial development division.

Under the new expansion program, CEI will build one transmission substation and three distribution substations. First of these is already under construction in Wickliffe.

CEI's construction schedule calls for completion of the Wickliffe substation in early 1953, a substation in Mentor township late next year, and a third distribution substation in Concord township the following spring. The transmission substation, which will be directly connected with CEI's 132-kv steel tower transmission system, is expected to go into operation in the Fairport area late in 1954—it will cost approximately $1.7-million.

East lake power plant will go on the line next year with two 125,000-kw turbogenerators. In early 1954 a third 125,000-kw unit will be put in operation and a 208,000-kw generator will be added in 1956.



for longer meter life
under extreme
atmospheric conditions

Sangamo J Meters

Longer meter life—even under the most severe service conditions, is the subject of constant study and research at Sangamo.

As part of Sangamo's continuous program of improvement, new alloys and surface treatments are now incorporated in Type J Watthour Meters. All aluminum, copper alloy, and ferrous parts are treated with finishes proved most suitable for protection against attack from moisture and from air-borne organic and inorganic substances.

These finishes give greater protection to both external and internal meter parts and assure better performance in humid, salt-laden or corrosive atmospheres. This greatly extends useful meter life under extreme atmospheric conditions.

As new technologies develop, they will be used by Sangamo to still further increase the dependability and long life accuracy that the Utility Industry has a right to expect from the watthour meters they buy.

The full story of this new development is told in Sangamo Bulletin 201. Write for copies today.

Only Measured Facts are Known Facts

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

SM52-13

Sangamo J Meters have proved their ability to meet today's requirements and tomorrow's anticipated loads with sustained accuracy, economy of maintenance and troublefree performance.

LET'S LOOK AT THE FACTS

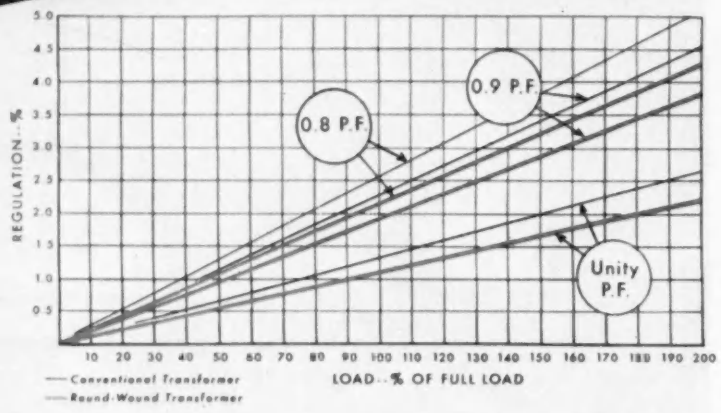


FIGURE 1—Regulation of a standard 50 kva 2400—120/240 volt Round-Wound transformer compared with that of a conventional transformer, showing the effect of load and power factor on regulation.

How L-M Round-Wound Design Improves Transformer Regulation

A brief discussion of the design factors affecting regulation, and the differences in the design of Round-Wound transformers that result in better regulation at all power factors.

By **JAMES G. EVERHART**
Chief Engineer,
Transformer Division,
Line Material Company

Voltage regulation, always an important factor for consideration, has in recent years received even more attention. Higher average secondary voltage at full load means brighter lights, less lamp flicker, and improved operation of the growing number of appliances. It is particularly important in the operation of television receivers, where low voltage produces far greater effect than is generally known by the public.

Higher voltage produces greater revenue to the utility company and, in these days of extremely close margins or actual operating losses, utility companies cannot afford to neglect any source of potential revenue.

State power commissions also have become factors in maintaining regulation. And with the higher average loading of transformers prevalent today, voltage regulation becomes a somewhat more pressing problem.

Use of Capacitors Helpful

Much can be gained from the use of capacitors to improve voltage conditions. But capacitors alone cannot be expected to solve the entire problem.

Neither can adequate primary voltage, ample transformer rating, or shorter secondaries of ample size. The transformer *itself* must be designed to provide good regulation.

Methods of Improving Regulation

Poor regulation in a transformer is largely the result of high impedance due to high reactance, and high copper loss. Often large mean-turn diameter is the cause of high copper loss and poor regulation. In general, most design improvements that will reduce copper loss will also contribute to improved regulation. The problem in transformer design is to achieve the desirable results without the sacrifice of other desirable performance characteristics.

Regulation also must be uniformly good over all power factors. Figure 1 indicates the effect of load on regulation, it being evident that the poorest regulation is obtained with combinations of high loads and low power factors.

Regulation with Round-Wound Design

A Round-Wound transformer basically consists of a wound core, with long round coils wound directly onto the annealed core. With the exclusive L-M method, the core is not cut or unwound in any way. This is not necessary since the coils are wound directly onto the core in an L-M designed winding machine. The construction is shown diagrammatically in Figure 2.

The design achieves a number of advantages—better cooling throughout the coils, with better overload capacity; lower exciting current; lower copper loss.

"Round-Wound" is a Line Material Co. trademark.

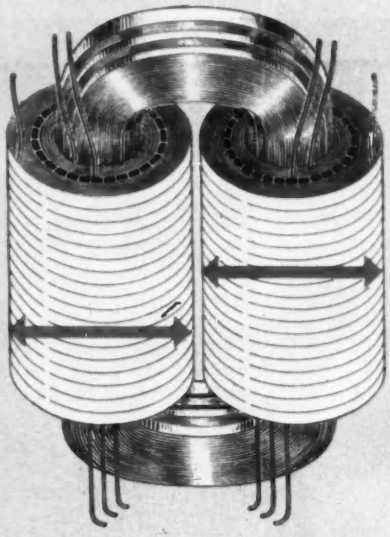


FIGURE 2—Round-Wound design. Long round coils are wound directly onto a wound core. Coils have low mean-turn diameter, a principal factor in the good regulation of Round-Wound transformers.

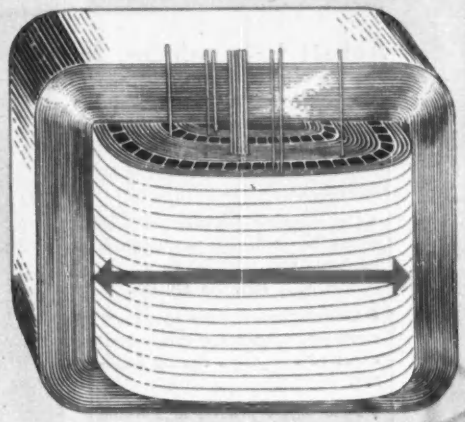


FIGURE 3—Shell type transformers generally have a much larger mean-turn diameter contributing to higher impedance, higher reactance, higher copper loss, which in turn results in poorer regulation.

The desirable smaller mean-turn diameter of the L-M coils is evident, by comparison of Figures 2 and 3 and examination of Figure 4. A higher efficiency core-coil arrangement also permits fewer winding turns. The combination of smaller turn diameter and fewer turns results in lower reactance and impedance, and in the desirable regulation indicated by Figure 1.

Thus the economy-minded power company can well take advantage of this Round-Wound design to secure, at one time, the savings offered by better regulation, lower losses, lower exciting current, and higher overload capacity.

Desirable Characteristics of L-M Round-Wound Transformers

Better Regulation: low resistance and reactance, providing low copper loss and better regulation, with more revenue to the utility and better service to customers.

High Short-Time Overload Capacity: long round coils and ample passages for oil circulation provide exceptionally good cooling with relatively low copper and hot-spot temperatures, permitting higher short-time overloads and higher load factors.

High Uniform Impulse Level: round coils are wound evenly, without hammering to shape; have longer creepage distance; ample insulation between layers and windings.

High Short-Circuit Strength: round coils have fundamentally superior strength characteristics, contributing greatly to the long life of Round-Wound transformers.

Low Exciting Current: because the wound core is not cut or disturbed, air gaps are not created in assembly, and exciting current is appreciably lower in this design.

Better Loss Ratios: the Round-Wound design makes possible an improved ratio of losses with lower total losses without sacrificing low exciting current.

For More Information

Ask the L-M Field Engineer for bulletin on L-M Round-Wound design, or write Mr. Everhart at Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

Round-Wound transformers are filled with ORTO®, L-M's oxidation-resistant transformer oil, inhibited for longer life.

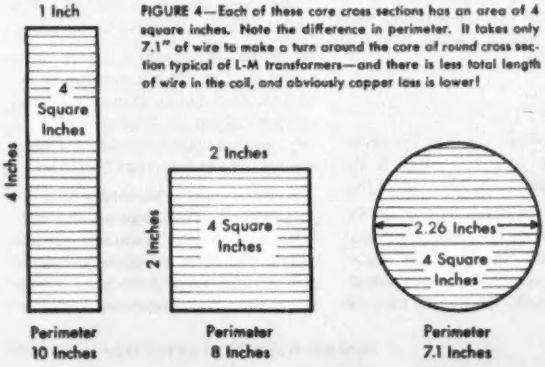


FIGURE 4—Each of these core cross sections has an area of 4 square inches. Note the difference in perimeter. It takes only 7.1" of wire to make a turn around the core of round cross section typical of L-M transformers—and there is less total length of wire in the coil, and obviously copper loss is lower!

LINE MATERIAL
Transformers
Complete Coordinated Equipment for Distribution Today

MANAGEMENT AT WORK-III

Abbott L. Penniman, Jr

Vice President, Consolidated Gas, Electric Light and Power Co of Baltimore, has these duties and responsibilities:

- **Helps develop company policy by sitting in on regular management meetings and working on an informal basis with top officials.**
- **Has charge of planning, design, construction, operation and maintenance of company's electric facilities.**
- **Takes active interest in working out personal and business problems of employees in his departments, takes part in employee functions.**

Here is how this operating VP spends his work day

9 am finds him at his desk, getting a line on how the day's electrical operations are shaping up. Much of his morning is spent on the phone, or phones—he has four to handle the load. Conferences with department heads and other employees follow

Al Penniman's Job: To Make Sure

Abbott L. Penniman, Jr, better known to the industry as Al Penniman, bosses power operations for Consolidated Gas Electric Light & Power Co of Baltimore.

As a vice president with some 3,000 employees under his supervision, he is fully responsible for planning, design, construction, operation, and maintenance of the company's electric facilities.

He's worked his way up the Horatio Alger way, starting nearly 42 years ago as a draftsman. Now, as vice president in charge of electric operations, he finds himself sitting in with other executives at the regular Tuesday morning "management" meetings at which policy is discussed and developed.

These meetings do not preclude development of policies on a more informal basis by the officials most directly concerned. The company maintains a free line of communication among its top men.

To keep in touch with departments under his supervision, Penniman regularly attends his general superintendent's meeting of department heads held every other Wednesday. These round-table discussions concentrate on problems of the electric departments.

On alternate Wednesdays, he goes to meetings called by the superintendent of construction. At these he is brought up to date on every project under way. And Consolidated's construction program is extensive. The company is constantly increasing facilities to meet the fast-growing need for electric service in the 2,300 sq mi service area.

I. His Day

Even a "routine" day for Penniman is very, very crowded. Here is the Boswell of one such, Nov. 12, 1952:

8:30 am—Penniman arrived at the office and removed from brief case papers studied the previous night. These, with comments, were distributed to his staff. He looked over his appointment list and mail and gave directions to his secretary for the preparation of replies.

9:15 am—Had a talk with the general superintendent.

9:35 am—Telephoned superintendent of distribution about a pole line.

9:50 am—Conversed by phone with official of a machinery manufacturing outfit about plans for the meeting of an air-pollution group.

10:05 am—Discussed problem on phone with the chairman of the board.

10:10 am—Received a report on a safety measure from a member of the Electric Distribution Department, and another on outage from the office of the general superintendent. Called manager of the Personnel Department.

About 11 am system operating reports arrived. Then came another conference with the assistant general superintendent on government control of materials. During this time, Penniman signed requisitions for materials.

1 pm rolls around and he goes to the Engineers Club for luncheon with a Baltimore professional group. To keep abreast of his job he must keep up contacts with engineering and civic groups outside of working hours, read scores of news and technical publications

3 pm takes Penniman (left) to Gould Street Station for inspection of an additional 100,000-kw unit that went on the line this month

Baltimore Has Power in Plenty

At noon, he attended a luncheon of the Engineers Club of Baltimore addressed by Gov Theodore McKeldin of Maryland; he sat at the head table with the governor and club officers.

After lunch, Penniman drove to the company's Gould Street Station for an inspection of the new 100,000-kw unit being installed there. He made a top-to-bottom check, frequently conferring with officials of the Construction and Power Departments who accompanied him.

By 3:30 pm, he was back in his office to continue his appointment schedule. First on the list was the general sales manager, who discussed the opening of a new community shopping center in the service area. Next, a staff member of the general superintendent's office brought in a proposed memorandum to be used to brief top officials on progress being made in development of electric power by nuclear-fission. Following this, a manufacturer's representative called to discuss new equipment.

These appointments were cleared by 5 pm and Penniman resumed his "office work." This consisted of reading and signing the accumulated correspondence for the day, making decisions on matters which had come to his office during the afternoon and collecting papers on subjects he wanted to study further that night. With a full brief case, he reached for his hat a few minutes before six.

Despite this schedule, Penniman manages to maintain a leisurely appearance. Conferences with his staff are brief, but not hurried. Employees who visit his office find him sympathetic to their problems be they business or personal. Once all the facts are stated, however, he is usually quick to point out a way to meet the problem. For his part, he follows through almost immediately.

II. Outside the Office

Beside company affairs, Penniman takes part in a host of outside activities that bear on his work. To select a few from the local, state and national level: Engineers Club of Baltimore, Maryland Water Pollution Control Commission, American Association for the Advancement of Science. His professional society memberships run through the entire engineering alphabet: AIEE, ASME, AOA, ASNE, NSPE, EEI, etc.

He is an executive who does not merely join. Penniman seems to thrive on professional controversy. His acquaintances like to take him on to get the benefit of his views.

He has developed much engineering equipment, earning patents and recognition as one of the outstanding power plant engineers in the United States.

In 1940, a committee of scientists under direction of Dr Karl T. Compton, selected Penniman to receive a special award as one of the country's modern pioneers of science.

While he reads only an occasional book outside his field, he reads periodicals avidly. A Sunday afternoon at

home may find him plowing through a stack of magazines a foot high. He says he has two ways of acquiring knowledge: from callers in his office and from technical and news magazines.

The callers have been mentioned. His other chief sources of knowledge include, he says, local newspapers, Science News Letter, Electrical World. As supplemental fare he lists Business Week, U. S. News and World Report and many engineering publications.

Al Penniman joined Consolidated in early 1911. On Jan. 1, 1914, he became superintendent of steam-electric generating stations. Steam generation for the district steam heating system was added to his duties in 1928. He moved up to become general superintendent of electric operations in November 1937.

Consolidated of Baltimore sets much stock in promoting from within, and when the job of vice president in charge of electric operations was open in March 1950, Penniman was picked as the best man available for the job.

During his service with the company, generating capacity has been increased from 24,000 kw to 755,000 kw. Gross revenue from the sale of electricity has risen from less than $2 million annually to more than $66 million annually. Service area has increased from 88 to almost 2,300 sq mi. Yet during that time, it's a good bet Al Penniman hasn't changed in his dealings with his fellow employees.

New Tribute to Thomas Edison

Charles Edison, son of Thomas A. Edison and former governor of New Jersey, unveils a bust of his father at the Naval Research laboratory at Washington, D. C. The famed inventor was a leader in establishment of the lab. Participating in the ceremonies are Dan A. Kimball (left), Secretary of the Navy, and Dr E. O. Hulburt, director of research at the lab.

Sales Expansion

EEI section outlines 1953 plans aimed at stepping up utilities' sales efforts

Stepped up selling efforts by power companies will be imperative in the days ahead, Shelley Sansbury, chairman of the sales section of Edison Electric Institute, told members of the section's four committees which met this month in Cincinnati.

"We must face up to the challenge of the day when business won't come in through the front door," he said, in summarizing the three days of activity.

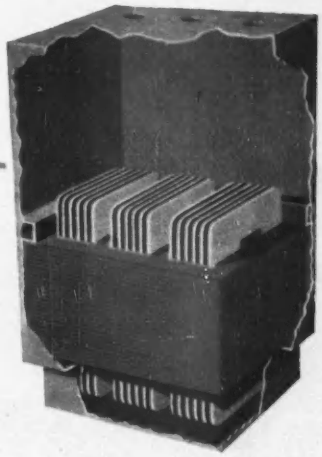
Underlining the progress made since the section's organizational meeting in September, Dewitt Pike stated that the Market Development and Electrical Applications Committee, which he heads, has released a handbook for commercial sales representatives on equipment applications in commercial establishments. It includes sections on air conditioning, ventilation, water heating, lighting, and cooking. Other sections in preparation cover refrigeration and auxiliary electric heating.

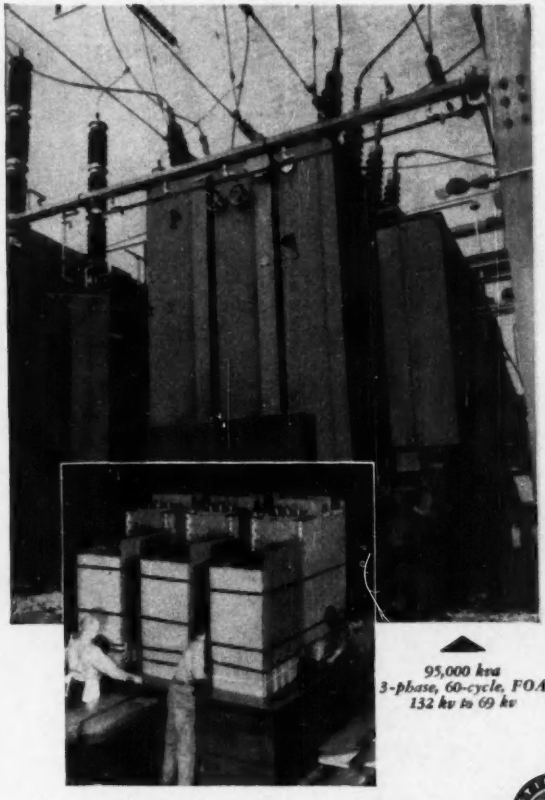
Recovery Theme Sounded . . . Ways to revive lagging sales of commercial lighting, down 35% since the end of World War II, were also discussed. According to Robert W. Butts, commercial lighting committee chairman, a new set of advertising materials to pep up sales will be available to members by fall of 1953. The committee is also making progress on a lighting sales department organizational manual.

Commercial cooking committee also considered several new projects, including formation of a Commercial Cooking Bureau to serve as a meeting ground where utilities and equipment manufacturers could iron out their mutual problems. An advance committee to explore the venture was appointed by E. P. Werley, chairman.

The committee also drew tentative plans for a newsletter. A trial balloon issue is to be prepared for issue early next year.

This design assures efficient cooling





95,000 kva
3-phase, 60-cycle, FOA
132 kv to 69 kv

The Form-Fit design of Westinghouse Power Transformers directs cooling oil to assure efficient heat transfer . . . efficiency that contributes directly to the superior operating characteristics of these transformers.

The reasons for this efficiency are based on simple fundamentals of transformer operation. Heat generated in any transformer comes from two sources: the windings and the core. The snug-fitting tank on a Form-Fit transformer directs the cooling oil to the heat-dissipating surfaces in the quantities required. This assures maximum use of the cooling oil. The pancake-type coils, standing in a vertical plane, form natural flues for rapid circulation—on *both sides* of each coil—resulting in low temperature gradients. This provides a greater cooling margin for overloads.

Form-Fit construction is ideal, too, for forced oil cooling. Since directed oil flow is inherent in the design, no baffles or other artificial devices need be introduced.

This compact, efficient design, with the added savings in size and weight affected by Hipersil® Cores, makes Westinghouse Form-Fit Power Transformers smaller and lighter per kva than any other design. The result is far more economical installation, as well as reduced maintenance expense. Your Westinghouse representative will be glad to discuss the savings possible on your system, or write for Booklet B-4142A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-70639A

YOU CAN BE SURE...IF IT'S
Westinghouse
POWER TRANSFORMERS

Meeting the Nation's Growing Power Load

Releasing Kilovars for More Active Duty

Today, utility engineers are asking "At what point . . . do you do what . . . to get more kilovars?" Concern about the method of controlling the flow of kilovars to industrial and residential load is the natural result of generating and transforming increases all along the line.

The ability of capacitors to provide solutions to many kilovar load problems is only now becoming generally recognized. Aside from the positive advantages of improved voltage regulation, reduced I^2R losses and reduced operating costs, is the over-all fact that lines and equipment ahead of the capacitors are released for more load. Eliminating reactive amperes also means more efficient power station performance.

Making capacitor applications more practical and attractive are recent developments that have lowered relative costs. Indeed, the cost for all other means of supplying kilovars has increased far more than the cost of capacitors during the last four years.

The capacitor is not a spectacular or complicated piece of equipment as electrical equipment goes, but through the years Westinghouse has made steady improvement through constant research, development and experience. We could point to many development firsts for the capacitor. In this case, we believe that our greatest contribution has been the introduction of new methods of mounting and applying capacitors, which has made their application more convenient, economical and practical in obtaining over-all efficient system performance. This vast Westinghouse utility experience is being constantly applied to the solution of many other important utility problems. J-97170

YOU CAN BE SURE...IF IT'S

Westinghouse

Series capacitors quadrupled in size

About two years ago, the road block that had long stymied the use of series capacitors on high-voltage lines was removed. This was the development of a means for shunting excess current, during a short circuit, around the capacitors without removing them from the circuit, and thus losing their value during the critical transient period. This switching arrangement was applied to a 15,000-kva bank of series capacitors at Chehalis, Washington, substation on the 230-kva system of the Bonneville Power Administration.

With the way thus cleared, bigger —much bigger—series capacitors came into view. Early in 1952, an installation more than twice as big—for 46,000 kva—was made, also on the Bonneville system. By the year's end, another one, again almost double in size—85,000 kva—will be placed in service on the Bonneville Power Administration system.

Switching high-voltage shunt capacitor banks

The Indianapolis Power & Light Company recently installed on its system one of the first 34.5-kv capacitor banks in this country.

This capacitor bank, totaling 7290 kva, was part of a program of locating var generation close to var load in the most economical and practical manner. This installation demonstrated that high-voltage, shunt capacitor banks can be switched without exceeding 2.4 times normal phase-to-ground voltage on the bus, a value in the range produced by interruption of short circuit currents.

Capacitor switching phenomena

The toughest job you can put on a breaker is the switching of capacitors. For some time, Dr. Roswell C. Van Sickle has been conducting extensive tests in the Westinghouse High Power Laboratory to determine the phenomena of capacitor switching, the performance of "De-ion®" grid oil circuit breakers, plain-break oil circuit breakers, magnetic blast air circuit breakers, and compressed air circuit breakers. For the complete description of Capacitor Switching Phenomena, write for the AIEE Technical Paper on this subject prepared by Dr. R. C. Van Sickle and John Zaborszky . . . Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

Illustration on opposite page

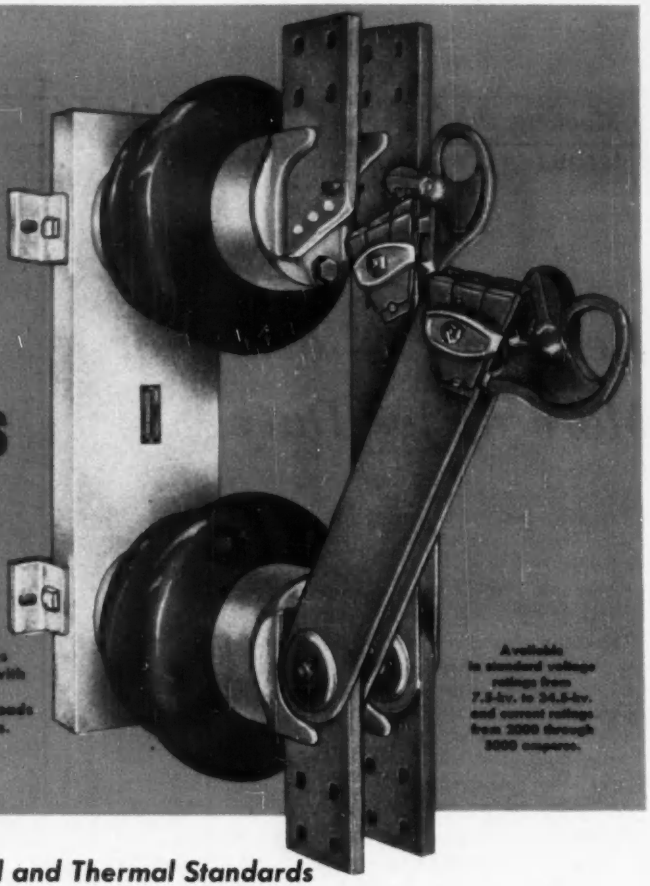
Pictured here is the largest unit in this country of the 69,000-volt rack class. This Westinghouse capacitor application for the Long Island Lighting Company comprises 1005 units for a total of 25,125 kvar.

Easy to Operate

DELTA-STAR'S B-2P

High Capacity Switches for Outdoor Service

A slight pull on the hook ring releases the pressure and the switch is opened with surprising ease. Contact pressure is maintained without the use of cams, threads or other complicated clamping devices.



Available in standard voltage ratings from 7.5-kv. to 34.5-kv. and current ratings from 2000 through 3000 amperes.

High Electrical and Thermal Standards

to meet the requirements of present and future power systems are built into these switches. They are designed and tested to carry full rated load continuously and withstand short circuit current to their full short time ratings without damage.

Straight Line Current Path

from terminal to terminal reduces to a minimum the number of current interchange surfaces. All current carrying parts are hard drawn copper with liberal cross section to provide ample material for heat dissipation. Individually sprung high pressure silver to silver contacts insure ideal contact.

For complete details, ask for Publication 5207

WHEN YOU WANT THE BEST IN HIGH VOLTAGE SWITCHING EQUIPMENT SPECIFY DELTA-STAR

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
2437 FULTON STREET, CHICAGO 12, ILLINOIS
DISTRICT OFFICES IN PRINCIPAL CITIES

NEWS ABOUT PEOPLE

Kunz Elected VP of Sangamo

H. Laurence Kunz, general manager of the Capacitor Division of Sangamo Electric Co at Marion, Ill., has been elected vice president of the company. As vice president, he will continue to serve as general manager.

Kunz started his career with Sangamo in 1926, after graduating from the University of Illinois with a degree in electrical engineering. For a number of years he served as assistant general sales manager, becoming sales manager of the Capacitor Division in 1945.

Kunz's election to the vice presidency follows his appointment as general manager of the Capacitor Division about a year ago.

H. LAURENCE KUNZ

Wishart Is Named General Manager

PAUL B. WISHART

Paul B. Wishart has been appointed to the newly created position of general manager of Minneapolis-Honeywell Regulator Co. Wishart, who will continue as vice president, also has been elected to the company's board of directors.

Wishart has been with Honeywell for 11 years and since 1945 has been vice president in charge of manufacturing in the company's Minneapolis plants.

A native of Missouri, the new general manager was graduated from the U. S. Naval Academy in 1920 and spent three years in naval service before starting his business career. Before joining Honeywell in 1942, he spent 19 years in various phases of the automobile business and has had wide experience in both the manufacturing and sales fields.

•

J. S. Roscoe has been appointed executive vice president in charge of business administration for Lincoln Electric Co, Cleveland. With Lincoln since 1924, Roscoe has been director of purchasing since 1951.

Martin F. Schonefeld has been appointed general superintendent of the Fort Wayne Division of Indiana & Michigan Electric Co to supervise all engineering, construction, maintenance, and operations of that division. Starting with Indiana & Michigan in 1925, Schonefeld has headed the engineering department at Fort Wayne since 1934.

Clifford C. Gramer, advertising manager of Hotpoint Co, Chicago, has been named merchandising manager. The company also has appointed **Gordon G. Hurt,** assistant advertising manager, to the post of advertising manager.

C. B. Campbell has been named consulting engineer and **J. R. Carlson** manager of engineering for the Steam Division of Westinghouse Electric Corp. Campbell, who started with Westinghouse in 1919, has been manager of engineering since 1944. Carlson, who joined the company in 1926, has served as manager of the division's general engineering section since 1947.

J. Dale Hampton has been named division sales supervisor for Oklahoma Gas & Electric Co's Western Division. Hampton, who will make his headquarters at El Reno, will be in charge of all company sales activities for the El Reno, Norman, Guthrie, and Woodward districts.

E. B. Looney has been made manager at Trumann for Arkansas Power & Light Co to succeed **Felton M. Smith,** who has been named manager at Hughes. Looney, who has been engineer-draftsman at Forrest City since 1951, began with the company in 1948. Smith, who became manager at Trumann nearly five years ago, joined Arkansas P&L in 1941.

•

GERARD SWOPE, JR

Swope Is Appointed VP of General Electric Unit

Gerard Swope, Jr, has been named vice president of the International General Electric Co.

Swope, who is head of the company's law department, started with General Electric Co in 1940 as counsel for the appliance and merchandise department at Bridgeport, Conn. In 1946 he joined International General Electric as counsel, a position he still holds.

"The Accepted Standard with Utilities Everywhere"

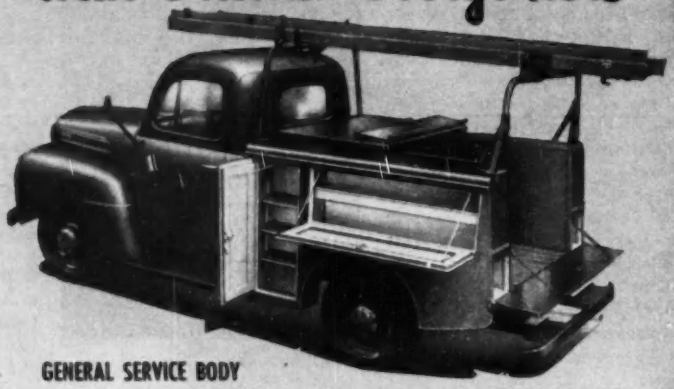
LINE CONSTRUCTION BODY (600C)
This workhorse of the utility industry can be furnished in lengths from 9' to 14' for any type of utility construction work.

REVOLVING AERIAL LADDER
Models available in working heights of 23' 6", 26' 6", 30' 6", and 32' 6" for all styles of bodies.

COMPARTMENT SECTIONS
Available in 74", 84", and 104" lengths for all standard pick-up or express-type bodies.

LIGHT DUTY MAINTENANCE BODY (350)
This compact unit is widely used for service and light duty construction. Fold-over derrick can handle 40' poles.

There are many styles of *Powers-American* Bodies not shown here. Write for descriptive catalog today.



GENERAL SERVICE BODY
Available in a wide range of body styles to fit operating requirements in all phases of the utility industry. Models can be furnished for ½, ¾, 1, and 1½ ton chassis. Compartments can be equipped with shelves, bins, and accessories to suit individual needs.

The 1 Source
for all types of utility bodies and equipment!

There's no need to look further than *Powers-American* to solve all your utility body and equipment needs. Whether the job calls for a small service body for repair work, a line body for large construction jobs, or special equipment such as towers or ladders, *Powers-American* is *your* answer.

Leadership in construction, maintenance and service work in all phases of the public utility industry guarantees long life and trouble-free service. Write today for more information.

POWERS *American* DIVISION

PUBLIC UTILITY BODIES AND EQUIPMENT

McCABE-POWERS AUTO BODY COMPANY
5901 North Broadway, Saint Louis 15, Missouri

SANTA CLAUS has a lot of fun conducting his young admirers around the model railroad at pre-Christmas appliance show sponsored by the San Diego Bureau of Home Appliances

YOUNG MISS is favorably impressed by giant display-model vacuum cleaner

Appliances Sell Fast at Pre-Holiday Show

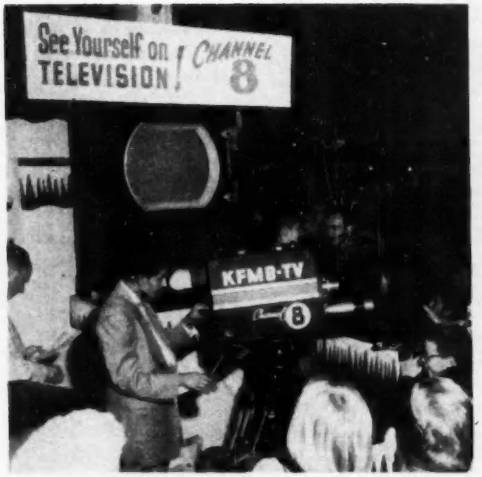
The 15th annual pre-Christmas Electric & Home Appliance Show at San Diego, Calif., sponsored by San Diego County appliance dealers and San Diego Gas & Electric Co. closed a successful six-day run early this month.

Off-the-floor sales were reported by exhibitors to be bigger than at any other show during the past 15 years. And attendance of 185,000 equalled the record set in 1951.

Those visiting the exhibit were in a buying mood. One dealer reported that in one hour one of his salesmen manning the booth of a national line sold four washing machines. Other dealers matched reports like this one.

There were 75 exhibitors in the four large rooms making up the Electric Building in Balboa Park. A total of 200 products were exhibited.

Official host of the appliance show was jolly old St. Nicholas. He got things off to a bright start by turning on the lights of "Christmas Tree Lane" adjacent to the show buildings.



POPULAR BOOTH at show was one set up by Station KFMB-TV where visitors got chance to see themselves on TV screen

ELECTRONIC RANGE displayed by Hotpoint attracts interest of the ladies. About 200 products were exhibited at show

Biggest Electric Utilities in the U. S.

10 classifications bring out the differences among leading systems and prove that the question, "Which is the biggest electric utility?" has many answers

There are many ways to answer the question, "Which is the biggest electric utility?" Bigness can be measured in many ways and not even in the definition of electric utility clear. Some companies are independent and operate their own systems; others operate as an integral part of a holding company.

In making nine of these ten listings (Anyone familiar with the industry can think of a dozen more.) The figures used are system figures; *i.e.*, they are the sum of those of all companies in the system whether this be one company or a dozen. In the tenth listing, "Leading Operating Companies and Municipals," the figures are for the individual companies.

Figures in the tables below are from the **1952 McGraw Central Station Directory**. The tables on the opposite page have been compiled from **Statistics of Electric Utilities in the United States for 1951**, a publication of the Federal Power Commission. Naturally there has been a change in the figures since these books were published; so in some instances the rank of a company may also have changed.

It must be remembered that these rankings are not to be interpreted as attributing any superiority to these companies. Many others unlisted may be more efficiently operated, may give better service, or may be more profitable. The area and population a company serves more or less determines a company's rank in all classifications.

Averaging the rankings of the various systems in the nine system classifications puts the Consolidated Edison and Pacific Gas & Electric Systems in a tie for first. Commonwealth Edison System of Chicago is third; the American Gas & Electric System, fourth; and the Southern Co System, fifth.

If the two hydro classifications are eliminated (Many systems have no hydro sites in their territories.), Consolidated Edison System is in the No. 1 spot. Then in order come Commonwealth Edison System, the American Gas & Electric System, Pacific Gas & Electric System, and the Southern Co System.

It is interesting to note that the American Gas & Electric System, which serves no large cities, is now the nation's greatest producer of electricity.

Leading Systems

(Compiled from 1952 McGraw Central Station Directory)

Rank		Customers
1.	Consolidated Edison System	2,792,556
2.	Commonwealth Edison System	1,762,845
3.	Pacific Gas & Electric Co	1,402,675
4.	Public Service Electric & Gas Co	1,234,287
5.	American Gas & Electric System	1,231,695
6.	Southern Co System	1,114,331
7.	Southern California Edison Co	1,055,717
8.	Detroit Edison Co	1,013,223
9.	Philadelphia Electric System	962,551
10.	Niagara Mohawk Power System	936,249
11.	General Public Utilities System	859,907
12.	Los Angeles Water & Power Dept	772,810
13.	West Penn Electric System	735,350
14.	New England Electric System	723,964
15.	Middle South Utilities System	714,869
16.	Consumers Power Co	701,777
17.	Texas Utilities System	677,735
18.	Northern States Power System	668,772
19.	Central & South West System	636,572
20.	Virginia Electric & Power Co	620,576
21.	Duke Power Co	*618,000
22.	N. American (Union Elec) System	605,395
23.	Standard Gas & Electric System	570,892
24.	Pennsylvania Power & Light Co	560,018
25.	Ohio Edison System	526,347
26.	Boston Edison Co	492,683
27.	Wisconsin Electric Power System	456,754
28.	Cleveland Electric Illuminating Co	449,528
29.	Consolidated Power Co of Baltimore	432,243
30.	Long Island Lighting Co	391,212
31.	New England Public Service System	390,882
32.	Florida Power & Light Co	378,079
33.	New York State Electric & Gas Corp	375,453
34.	Cincinnati Gas & Electric System	345,134
35.	Public Service Co. of Indiana	326,318

* Failed to supply a new figure for 1952.

Leading Operating Companies and Municipals

(Based on figures in 1952 McGraw Central Station Directory)

Rank		Customers
1.	Consolidated Edison Co, New York, N. Y	2,723,328
2.	Pacific Gas & Electric Co, San Francisco, Calif	1,402,675
3.	Public Service Electric & Gas Co, Newark, N. J	1,234,287
4.	Commonwealth Edison Co, Chicago Ill	1,131,453
5.	Southern California Edison Co, Los Angeles, Calif	1,055,717
6.	Detroit Edison Co, Detroit, Mich	1,013,223
7.	Philadelphia Electric Co, Philadelphia, Pa	950,998
8.	Niagara Mohawk Power Corp, Syracuse, N. Y	934,302
9.	Los Angeles (Calif.) Dept of Water & Power	772,810
10.	Consumers Power Co, Jackson, Mich	701,777
11.	Public Service Co of Northern Illinois, Chicago	631,192
12.	Virginia Electric & Power Co, Richmond, Va	620,576
13.	Duke Power Co, Charlotte, N. C	618,000*
14.	Northern States Power Co, Minneapolis, Minn	565,767
15.	Pennsylvania Power & Light Co, Allentown, Pa	560,018
16.	Boston Edison Co, Boston, Mass	492,683
17.	Georgia Power Co, Atlanta, Ga	480,076
18.	Union Electric Co of Missouri, St. Louis, Mo	469,514
19.	Appalachian Electric Power Co, Roanoke, Va	458,091
20.	Ohio Edison Co, Akron, Ohio	455,384
21.	Cleveland Electric Illuminating Co, Cleveland, Ohio	449,528
22.	Consolidated Gas, El & P Co of Baltimore, Md	432,243
23.	Duquesne Light Co, Pittsburgh, Pa	429,665
24.	Wisconsin Electric Power Co, Milwaukee, Wis	405,227
25.	Long Island Lighting Co, Mineola, N. Y	391,212
26.	Florida Power & Light Co, Miami, Fla	378,079
27.	New York State Electric & Gas Corp, Ithaca, N. Y	375,453
28.	Alabama Power Co, Birmingham, Ala	374,214
29.	West Penn Power Co, Pittsburgh, Pa	369,261
30.	Ohio Power Co, Canton, Ohio	368,844
31.	Public Service of Indiana, Plainfield, Ind	326,318
32.	Pennsylvania Electric Co, Johnstown, Pa	323,860
33.	Houston Lighting & Power Co, Houston, Texas	323,523
34.	Texas Power & Light Co, Dallas, Texas	306,958
35.	Potomac Electric Power Co, Washington, D. C	302,556

* Failed to supply a new figure for 1952.

Electric Plant Investment

1.	Pacific Gas & Electric Co	$1,159,562,274
2.	Consolidated Edison System	1,044,949,163
3.	Commonwealth Edison System	991,871,872
4.	American Gas & Electric System	813,878,320
5.	Southern Co System	664,308,366
6.	Southern California Edison Co	647,316,893
7.	Niagara Mohawk Power System	587,597,805
8.	Detroit Edison Co	540,385,134
9.	Philadelphia Electric System	479,185,201
10.	General Public Utilities System	455,889,354

Electric Operating Revenue

1.	Consolidated Edison System	$323,157,499
2.	Commonwealth Edison System	290,293,575
3.	American Gas & Electric System	205,880,371
4.	Pacific Gas & Electric Co	189,700,619
5.	Detroit Edison Co	159,441,057
6.	Southern Co System	157,482,840
7.	Niagara Mohawk Power System	152,541,659
8.	Public Service Electric & Gas Co	148,975,243
9.	Philadelphia Electric System	141,138,822
10.	Southern California Edison Co	117,817,206

Steam Plant Capacity
(kilowatts)

1.	Consolidated Edison System	3,172,700
2.	Commonwealth Edison System	2,717,000
3.	American Gas & Electric System	2,416,040
4.	Detroit Edison Co	1,700,000
5.	Public Service Electric & Gas Co	1,620,300
6.	Pacific Gas & Electric Co	1,601,525
7.	Philadelphia Electric System	1,540,250
8.	Southern Co System	1,367,000
9.	Niagara Mohawk Power System	1,217,350
10.	General Public Utilities System	1,125,965

Steam Generation
(thousands of kwhr)

1.	American Gas & Electric System	15,417,488
2.	Commonwealth Edison System	13,070,992
3.	Consolidated Edison System	12,906,722
4.	Southern Co System	9,723,256
5.	Detroit Edison Co	8,871,296
6.	Philadelphia Electric System	7,629,373
7.	Public Service Electric & Gas Co	7,181,010
8.	Niagara Mohawk Power System	6,955,613
9.	Duke Power Co.	6,646,519
10.	Ohio Edison System	6,566,402

Hydro Plant Capacity
(kilowatts)

1.	Pacific Gas & Electric Co	1,204,260
2.	Niagara Mohawk Power System	923,104
3.	Southern Co System	740,530
4.	Southern California Edison Co	525,220
5.	Duke Power Co	497,273
6.	Montana Power Co	366,840
7.	Carolina Aluminum Co	289,500
8.	Susquehanna Power Co	252,000
9.	Idaho Power Co	237,931
10.	Safe Harbor Water Power Corp	230,000

Hydro Generation
(thousands of kwhr)

1.	Pacific Gas & Electric Co	7,487,266
2.	Niagara Mohawk Power System	6,824,488
3.	Southern California Edison Co	3,138,353
4.	Montana Power Co	2,835,026
5.	Southern Co System	2,733,896
6.	Idaho Power Co	1,825,164
7.	Susquehanna Power Co	1,426,150
8.	Puget Sound Power & Light Co	1,407,142
9.	Washington Water Power Co	1,373,737
10.	Carolina Aluminum Co	1,177,103

Total Capacity
(kilowatts)

1.	Consolidated Edison System	3,172,700
2.	Pacific Gas & Electric Co	2,806,442
3.	Commonwealth Edison System	2,724,585
4.	American Gas & Electric System	2,607,231
5.	Niagara Mohawk Power System	2,140,454
6.	Southern Co System	2,108,840
7.	Detroit Edison Co	1,707,850
8.	Public Service Electric & Gas Co	1,620,300
9.	Philadelphia Electric System	1,540,250
10.	Duke Power Co.	1,477,248

Total Generation
(thousands of kwhr)

1.	American Gas & Electric System	16,165,194
2.	Niagara Mohawk Power System	13,215,485
3.	Consolidated Edison System	13,144,782
4.	Commonwealth Edison System	13,108,127
5.	Pacific Gas & Electric Co	12,521,125
6.	Southern Co System	12,457,156
7.	Detroit Edison Co	8,904,062
8.	Southern California Edison Co	7,680,040
9.	Duke Power Co	7,653,553
10.	Philadelphia Electric System	7,629,373

NATIONAL POWER SHOW, held at Grand Central Palace in New York, attracted more visitors this year than ever before in its 20-year history. Many new products were displayed at show

New Products Bow at Exhibit

Many items shown for first time at National Power Show. Bigger, more lavish displays are keyed to selling

Evidence that the seller's market is passing was easy to find at the 20th National Power Show in New York, Dec. 1-6. Crowds at this year's exposition, held under the auspices of the American Society of Mechanical Engineers, were larger and more searching in their inspection of product lines.

Exhibits were bigger and more lavish, but they were keyed more directly to selling. Both attendants too seemed more eager than usual to explain, demonstrate, and display their items. But first and foremost, as a clew to the change, was the number of new products either displayed for the first time or introduced in the last six months.

Attendance Up . . . Statistically the show stacked up about like this: Attendance in six days 32,000, up 2,000 from the last New York show in 1950. Exhibitors on the three floors of New York's Grand Central Palace totaled 360 up about 20. No official count of the number of items displayed was made. Show officials could only shrug and mutter "thousands." There could be little doubt that there were more new items than in any show since the war.

Predominantly these new products, and the "old" lines at the show, in the field of power generation and industrial power application reflected the major trends of the engineering profession toward the use of higher pressure, higher speed, higher temperature, more complex and more precise control criteria, as well as the urge to intensify processes generally.

Miniature Recorders . . . Significant of the effort to conserve space on the complex control boards of modern power plants and process industries was the number of firms offering miniature recording instruments as adjuncts to their line of conventional full size recorders. Among those displaying such instruments were: Brown Instrument Division of Minneapolis-Honeywell Regulator Co, Foxboro Co, and Republic Flow Meters Co. Bailey Meter Co's mock-up of a generating station's control room included a console with miniature instruments and a vertical panel with recording instruments. Bailey also showed a new oxygen and combustibles analyzer hooked to an electronic recording meter.

Leeds & Northrup Co's booth drew crowds with a working console of automatic load frequency control of the type used for regulating system power interchange and generation.

Taller & Cooper, Inc, featured a new sequential automatic recorder and annunciator that prints in sequence a log of deviations from normal power station (or substation) operation.

James G. Biddle Co showed for the first time an automatic direct-writing oscillograph that not only gives a trace of transient or fault conditions at the time of fault but also shows conditions approximately ¾ sec prior to the fault.

Popular interest in TV added to the appeal of RCA's working display of industrial television for observing stack emission, furnace combustion, telemetering, and the like.

Allis-Chalmers Manufacturing Co gave prominent play to its tube motor. Also shown was version of the splash-proof motor, outgrowth of the movement to outdoor and semi-outdoor power station and their need for excluding wind-driven rain from the interior of exposed motors.

Distribution Display . . . Stainless steel pole line hardware for use in the corrosive atmospheres of industrial districts—in the form of U. S. Steel's "Corten" adaptation—was one of the few items of utility distribution system interest at the show. Falling also in this area of interest was a display of light-weight aluminum alloy subway gratings shown by Irving Subway Grating Co.

In the trouble shooting department was Excel Electric Service Co's Allen ground detector that locates "grounds" on normally ungrounded delta systems while circuits are in operation.

Arrow-Hart & Hegeman Electric Co introduced at the show an electronic variable speed control for fractional horsepower motors. Control was achieved by combining an electronic half-wave rectifier and dc motor.

Manning, Maxwell & Moore, Inc, showed an electromatic pressure relief valve for boiler service that assures more accurately balanced operation at peak loads, conserves power, and decreases maintenance.

Standby Units . . . Something new in 125-v dc standby power units was introduced by Cogenel, Inc, (a division of Societe des Accumulateurs Fixes et de Traction-France). Known as the SAFT unit it is a hermetically sealed nickel-cadmium battery with sintered plates, mounted as a single unit with its own trickle charger. Sealing prevents evaporation of electrolyte and emission of gases from the battery cells.

Allen-Bradley Co offered information on a new auxiliary contact for three sizes of contactors. The auxiliary contact provides a quick and inexpensive way to increase the number of contactor poles without buying a new contactor unit. Also offered by A-B was a new limit switch with seven interchangeable heads adapting it to various motions of the controlled machine. Also featured were a manual starter switch with neon pilot light for a one-gang box and a mechanically held contactor of up to 300-amp capacity that requires no "hold closed" current.

CALENDAR

Edison Electric Institute
Accident Prevention Committee, Hotel Muehlebach, Kansas City, Mo., Jan. 12-13, 1953; Transmission - Distribution Committee, Shoreham Hotel, Washington, D. C., Feb. 12-13, 1953; Electrical Equipment Committee, Jefferson Hotel, St. Louis, Mo., Feb. 16-17, 1953.

Institute of Radio Engineers
Joint High Frequency Measurements Conference with AIEE, Statler Hotel, Washington, D. C., Jan. 14-16, 1953.

Canadian Electrical Association
Eastern Zone: Engineering Division, Nova Scotian Hotel, Halifax, N. S., Jan. 15-16, 1953; Sales Division, General Brock Hotel, Niagara Falls, Ont., Jan. 22-23, 1953; General Division, Mont Tremblant Lodge, Mont Tremblant, Que., Jan. 29-30, 1953; Following Western Zone Division Meetings will be held at Palliser Hotel, Calgary, Alta.: Engineering, Feb. 23-25; General Division, Feb. 25-26; Sales Division, Feb. 26-27, 1953.

American Institute of Electrical Engineers
Winter General Meeting, Hotel Statler, New York, Jan. 19-23, 1953.

National Rural Electric Cooperative Association
11th Annual Meeting, Civic Auditorium, San Francisco, Jan. 26-29, 1953.

National Association of Corrosion Engineers
Short Course in Corrosion in cooperation with University of California, Berkeley, Feb. 2-6, 1953.

Missouri Valley Electric Association
Industrial-Commercial Sales Conference, President Hotel, Kansas City, Mo., Feb. 5-6, 1953.

National Adequate Wiring Conference
La Salle Hotel, Chicago, Feb. 26-27, 1953.

Pennsylvania Electric Association
Winter Meeting, Transmission-Distribution Committee, William Penn Hotel, Pittsburgh, Feb. 12-13, 1953.

POWER CLUB OFFICERS: E. B. Haskell, P. J. Van Keuren, J. H. MacNeal, and R. T. Kaighin

Salesmen Told to Plan Ahead

Utility power salesmen should plan ahead for tomrrow, and the day after tomorrow, to get as much profitable business as possible, Robert C. Hienton, general sales manager, Cleveland Electric Illuminating Co, told the Interstate Power Club, Dec. 8.

Hienton suggested that each salesman make a forecast of his probable business for the next three years by dividing his industrial customers into accounts by size and then classify them as to planned capital expenditures for 1952-1955 to see which of them plan rapid expansion. He predicted that electrical equipment, oil and coal products and chemicals will expand more rapidly than other industries.

Another speaker H. Carl Bauman, American Cyanamid Co, talked on the cost of purchase power as compared with generated power in chemical plants. He said that there is a sizable segment of heavy industry—such as chemicals, paper, textiles, steel, and petroleum—which still has an economic choice on whether to buy or generate electric power for new or expanding plants. Such a choice, he said, involved a careful study of physical and economic considerations.

L. F. Livingston, E. I. du Pont, discussed industrial research and demonstrated his company's products. He said that the weight of an electric motor could be reduced by 50% if it were wound with wire insulated by Teflon.

At the meeting, the club elected E. B. Haskell, United Illuminating Co, chairman for 1953. He is pictured above with other new officers: P. J. Van Keuren, Rockland Light & Power Co, who has been named a director of the club; J. H. MacNeal, Staten Island Edison Corp, vice chairman; and R. T. Kaighin, Public Service Electric & Gas Co, the club's retiring chairman, director. C. R. Banes, Long Island Lighting Co, and S. F. Diffenderfer, Pennsylvania Power & Light Co, also were elected directors.

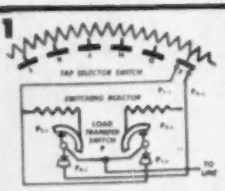
Claus in the Contract?

Christmas trees are a profitable business with Tacoma City Light. Under a contract signed with Alpine Evergreen Co, high-quality trees are harvested from lands around the utility's Cushman reservoir, bringing a minimum guaranteed payment of $1,000 in 1952 increasing to $2,500 in 1956. In addition, trees cut on transmission line right-of-way to Cushman hydro plant have brought in $375 so far this year. The contract specifies that the tree company will comply with all requirements of forestry services.

It's the Principle of

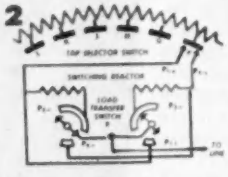
These schematic diagrams show the sequence of switching operations. Switching reactor loss is eliminated in all operating positions on 1¼% step voltage regulating apparatus and in half of the positions on ⅝% step voltage regulating apparatus. Colored lines indicate paths of current.

1



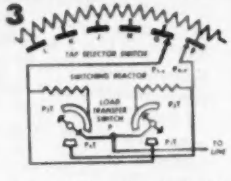
Switch positions for Load Tap Changer Operating Position No. 1 on either ⅝% or 1¼% step voltage regulating apparatus (assuming Reversing Switch is in Buck position). A 10% voltage buck is provided in this position. Note that reactor is by-passed.

2



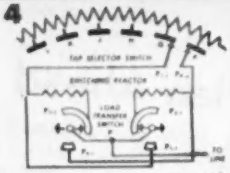
Assuming there has been an increase in load and the line voltage decreases, the Automatic Control, after a time delay, actuates the driving motor. The motor drive mechanism rotates the Load Transfer Switch 45° counter-clockwise, shunting all of the current through one half of the Switching Reactor.

3



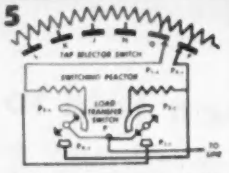
While the Load Transfer Switch remains in the position shown in Fig. 2, the motor drive mechanism continues to operate and rotates the Tap Selector Switch to the bridging position illustrated above. No arcing takes place since no current is flowing through moving contact P1-s.

4



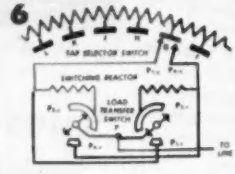
Load Transfer Switch rotates 45° counter-clockwise causing current to flow through both halves of reactor. Load Tap Changer is now in bridging position which is Operating Position No. 2 on ⅝% step apparatus and tap change has been completed. On 1¼% step apparatus this is a transitory position.

5



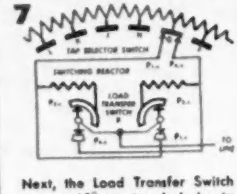
On 1¼% step apparatus the motor drive continues to operate and rotates the Load Transfer Switch 45° counter-clockwise, again shunting all of the current through one half of the reactor in preparation for the movement of the Tap Selector Switch to its next position.

6

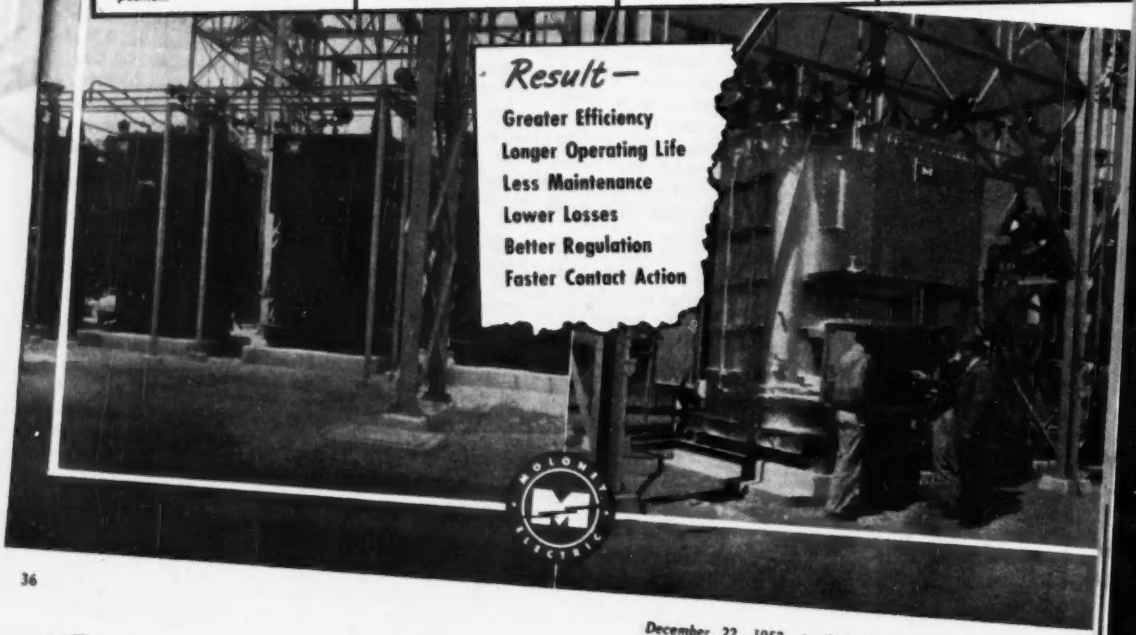


With no current flowing through moving contactor P4-s, the Tap Selector Switch now moves to the next position with P1-s and P4-s on stationary contact G.

7



Next, the Load Transfer Switch rotates 45° counter-clockwise to complete the tap change. There is no reactor loss since the current flows through parallel by-passing circuits P1-s, P1-s P and P4-s, P4-s, P to the line. Load Tap Changer is now in Operating Position No. 2 on 1¼% step apparatus.

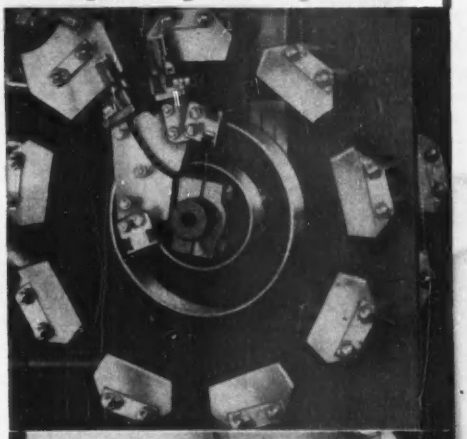


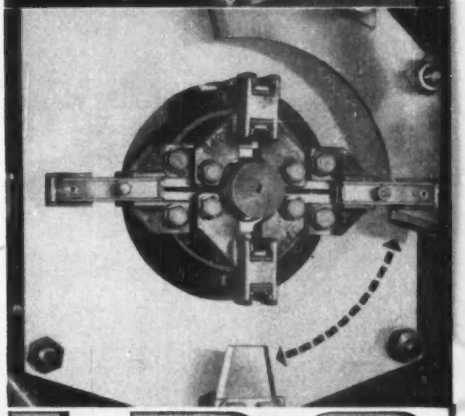
Result—

Greater Efficiency
Longer Operating Life
Less Maintenance
Lower Losses
Better Regulation
Faster Contact Action

the thing

...that makes *MOLONEY* LRC *EQUIPMENT* the outstanding performer in the Voltage Regulating Field





How it Works

ELECTRICALLY

No arcing duty is imposed upon any of the tap selector switch contacts, avoiding the necessity for replacement due to burning or scoring. A separate switch is used for breaking load current, and a reactor in parallel with this switch during each opening and closing keeps arcing here to a minimum. Virtual elimination of arcing not only prolongs the life of the contacts but also preserves the quality of the oil in the tap changer compartment.

MECHANICALLY

The load transfer switch, which is the only switch required to transfer load current, is provided with accelerating springs and is driven by Geneva gears. The design provides a means of opening and closing the load transfer switching elements at a high rate of speed without shock to the gearing or other parts.

Moloney Load Ratio Control Equipment is provided on Load Ratio Control Transformers, Power Regulating Transformers, and medium and large ratings of Step Voltage Regulators.

MOLONEY ELECTRIC COMPANY

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers Step Voltage Regulators • Unit Substations

SAINT LOUIS 20, MISSOURI

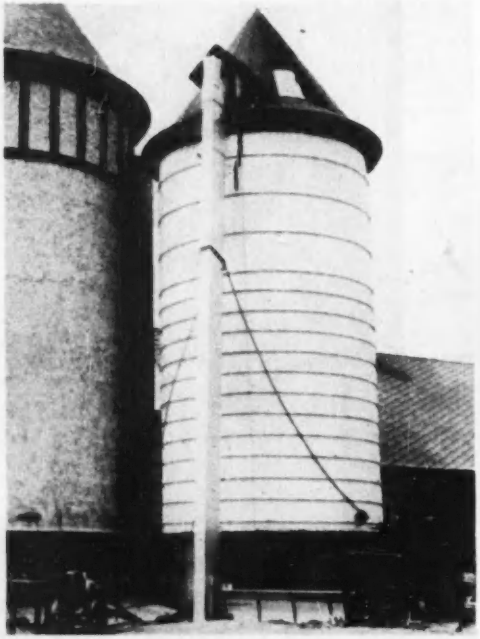
ME-52-31

LRC

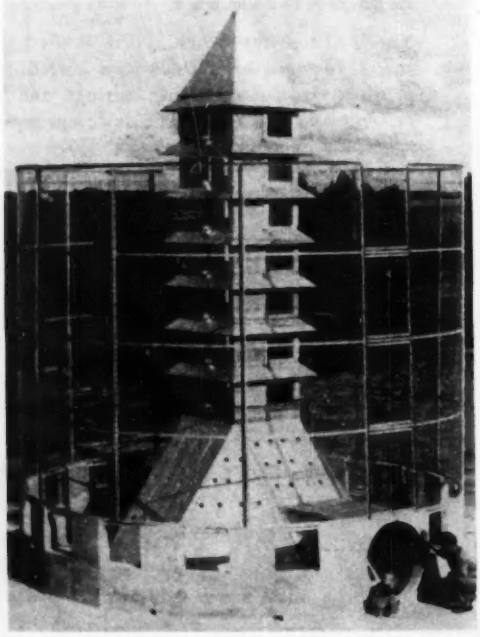
MOLONEY
LOAD RATIO CONTROL

FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

1 **AUTOMATIC FEED GRINDER AND BLENDER,** still in experimental stages, uses eight motors in this installation. Grain is placed in elevator back of trailer, lifted into transportation conveyor at top, and then into corn crib at left or one of three bins at right. Material passes from bins to blender conveyor where it is metered and carried to the elevator, from where it slides through a chute over a magnet and into the auger grinder feeder. Blended mixture passes through the grinder and is blown to the grinder collector. It can then be bagged or directed to booster blower and delivered to booster blower collector. Project has been a cooperative effort between Illinois Agricultural Experiment Station and U. S. Department of Agriculture, with funds provided by Public Service Co of Northern Illinois



2 **SILAGE ELEVATOR** powered by a 5 hp electric motor to lift chopped forage into silos and mows. It overcomes need of using a tractor for this power, freeing it for use in the field. This unit was developed at Pennsylvania State College in cooperation with New Holland Machine Division of the Sperry Corp



3 **COMBINATION DRYING AND FEEDING BIN** where hay can be dried and then fed by self-feeding arrangements. Using one 5 hp motor and two fractionals, these units are made by Habco Mfg. Co. If hay is fed out by early fall, the same crib can be used for drying and storing of ear corn

The Latest in Farm Electrical Equipment

W. D. HEMKER, Agricultural Engineer
Westinghouse Electric Corporation

Up to the present time, the greatest increase in efficiency of the farm worker has been in field operations by the use of field machinery. The chore operations performed in and around the farmstead buildings have not improved in efficiency to the extent that the field operations have. However, progress is being made.

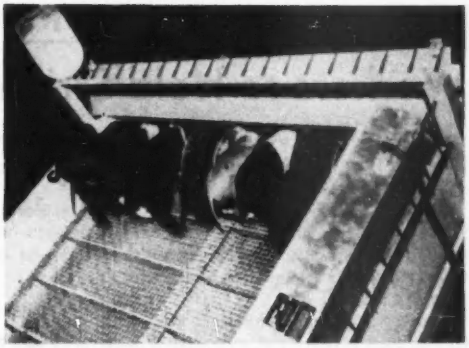
With more and more new equipment being developed for the processing of farm crops and products and the increasing use of electrical power to perform the chore operations, the efficiency of these activities will no doubt increase as have the field operations. Electrical power is a "natural" for chore power. Its flexibility and ease of control is one of the main factors in saving time, increasing safety, and reducing costs of operations in and around the farm buildings.

Agricultural engineers have always had a very prominent part in the development of new machinery to mechanize farming operations. In almost all of this development, the influence of the agricultural engineer has been in evidence. He may be a representative of an electrical power supplier, state experiment station, or a manufacturer, but you will almost without exception find him working with farmers too, helping to apply engineering principles to farming operations to replace physical energy with machine power.

Much of the early equipment was homemade or fabricated in local machine shops from scrap materials because new equipment was not generally available from manufacturers. This was an important phase of electrical productive equipment development. The farmers were looking for ways to increase the efficiency of the manhours required for doing farm jobs. This stimulated many research and development engineers at the various state colleges to try to solve these problems even in the face of material shortages. Rural service engineers of power suppliers and manufacturers also helped in this development.

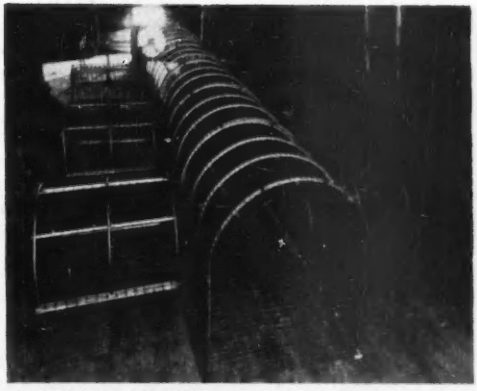
Oftentimes substitute materials had to be used. By the end of the war there was a definite pattern of equipment demand built up to show manufacturers what the farmers' needs and desires were. Typical illustrations of this type of equipment were crop drier, portable elevator, barn cleaner, silo unloader, poultry mash feeder, and infrared brooding of poultry, pigs, and lambs.

These are tried and proven applications of electrically operated productive equipment. Undoubtedly, the trend toward new developments will continue for some time to come. The accompanying pictures cite a few examples of some new developments that give promise of being practical commercially.



4 **BATTERY PIG BROODER** equipped to feed synthetic sows' milk to pigs after they are two days old. Using two 300-w heat units, the feed trough on each deck has ten compartments. It is claimed that this makes it possible to produce three litters a year

5 **TRAMP IRON DETECTOR-REJECTOR** designed to curb "hardware sickness" among cows, caused by pieces of baling wire and wire fencing getting into chopped hay and forage. Perfected at University of California, it consists of a detector solenoid and associated electronic tubes, relays and contactors. Presence of metallic objects in the air stream cause the relays to operate a trap door in the blower pipe to reject the object with a small quantity of forage



6 **HAY AND CROP DRIER** using a number of prefabricated ducts that can be used to form almost any kind of arrangement necessary for drying forage and ear corn. This one, made by Clay Equipment Co, is powered by a 5 hp motor

Workers to Hold Strike Vote...

. . . on Dec. 31 at Seattle City Light. Lloyd Smith of IBEW says strike action would be unpopular but we have been forced into it

City Light employees at Seattle will vote Dec. 31 on authorizing a strike, as the result of action by their Joint Crafts Council of 21 American Federation of Labor unions.

A new Seattle salary ordinance, effective Jan. 1, gives the employees raises ranging from $10 to $25 a month. Union officials complain these raises are inadequate and charge that the city has refused to bargain collectively.

Union Demands . . . The unions ask for minimum wage increases of $25 a month, to be added to administrative raises based on length of service; separation of sick leave from vacation, with three weeks vacation and four weeks sick leave after ten years; and clarification of the City Council resolution on labor contracts "so as to provide for true collective bargaining."

P. C. Spowart, assistant superintendent of City Light, replied that the City Light negotiating committee "has done everything possible for us to do, within the structure of our law."

Area Wage Scales Should Be Used . . . Lloyd Smith, business representative of Local 77 of the International Brotherhood of Electrical Workers, declares that "the City Council insists on tying City Light wages to those in tax-supported departments" rather than keeping them in balance with scales paid electrical workers elsewhere in the area. Since "City Light is in good financial condition and is in competition with private enterprise," it should have "nothing to do with tax-supported departments," reasons Smith.

The proposed new hourly scale of $2.535 for City Light linemen is only a few cents above existing scales by several Public Utility Districts in the state, Smith pointed out, and these scales may be increased to as much as $2.65 by negotiations now in progress.

Strike Unpopular . . . "We realize that strike action would be unpopular," said Smith. "We have been forced into it, however, by the city council and, I think, deliberately. There has been no semblance of bona fide contract negotiations on the part of the city."

Engineering Group Puts Out Manpower Booklet

A booklet entitled "How to Improve the Utilization of Engineering Manpower" has just been released by The National Society of Professional Engineers in Washington, D. C.

It contains a survey of more than 495 companies employing more than 2,750,000 people in 3,948 plants. This showed that these companies needed about 11,000 more engineers on Sept. 1. If these needs are met, the survey continues, they will need another 8,000 engineers between Sept. 1, 1952 and March 1, 1953.

More than half of the companies participating in the survey reported they were using auxiliary sources of engineering talent to lighten their engineering workloads. More effective use of engineering college teachers and students and women engineers would help to ease industry's engineering requirements, the booklet pointed out.

Utility Sends Employees in Service Family Photos

A unique Christmas gift has been mailed by the New York State Electric & Gas Corp to its 60 employees serving with the armed forces in various parts of the world.

The gift—a threefold leather photograph case with the employee's name inscribed in gold on the outer fold—contains three studio photographs of the employee's immediate family.

Accompanying each gift was a Christmas card from Joseph M. Bell, Jr, president, extending the season's greetings to the employees with the following note: "Your friends at New York State Electric & Gas are thinking of you during the holiday season, and send you best wishes for a good Christmas. We are looking forward to your return! Best of luck!"

NLRB Holds Bargaining Not Required in Slowdown

You don't have to bargain with a union during a slowdown. The National Labor Relations Board has added this interpretation of the Taft-Hartley Law to an earlier ruling that you can dismiss a worker who engages in a slowdown.

At the same time, however, NLRB held that an employer is not bargaining in good faith if he:

1. Insists that the union take a larger wage increase in lieu of "fringe" benefits.

2. Refuses to give the union any information on a group insurance plan that has been in effect for the employees.

Parties involved in the case are Phelps Dodge Copper Products Corp. Elizabeth, N. J., and the CIO United Electrical Workers.

LABOR BRIEFS

Georgia Power Co's Pres Harllee Branch has told a Southeastern Business Conference that workers are a corporation's most important asset and therefore its No. 1 responsibility . . . **A 90-day strike** at the electric range plant of Philco Corp at Mt. Clemens, Mich., has ended. Workers were granted an 11¢ hourly pay boost and a new contract included a cost of living escalator clause. Workers are members of the International Brotherhood of Electrical Workers, AFL . . . **General Motors Corp** Frigidaire Division employment has hit 20,000 mark, highest since the record 23,500 set in July, 1948.

Mutual confidence is the key to successful labor relations, C. G. Frantz, president, Apex Electrical Manufacturing Co, told the Texas Personnel and Management Association recently. He cited his weekly letter to Apex employees as one of the major tools in his human relations program. The letters deal with the company's activities and problems and any matters affecting the worker's welfare.

For interesting booklet entitled "How to Work Safely," write Mead Schenck, advertising manager, Interstate Power Co, Dubuque, Iowa.

Pearson F. Williams
CHAIRMAN OF THE BOARD AND PRESIDENT

Andrew E. Papp
EXECUTIVE VICE PRESIDENT
GENERAL MANAGER AND CHIEF ENGINEER

C. W. Sward
VICE PRESIDENT AND SALES MANAGER

we thank you...

Fully aware of the important part our customers have played in helping G&W to become the standard of comparison in the industry, we—as individuals and as an organization—want to express our thanks to you in person.

Next time you're in Chicago, why not drop in for a visit? Meet some of our people . . . see our new facilities, our modern equipment, our exacting manufacturing methods, our rigid inspection . . . all geared to provide specialized cable accessories of quality and performance.

We're only a 20-minute cab ride from your hotel or loop headquarters. Visit us soon . . . we want to know you as more than a signature on a letter, or a voice on the phone!

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J. H. Nicholas
ELECTRICAL ENGINEER

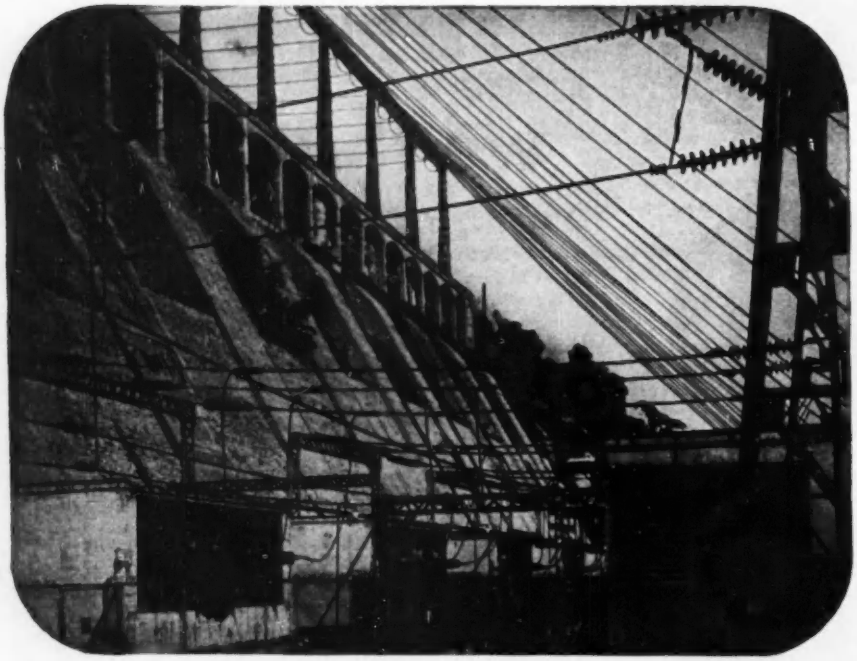
Center, L to R

L. J. Dylewski
ASSISTANT SALES MANAGER
W. J. Dres
APPLICATION ENGINEER
R. E. Boyle
APPLICATION ENGINEER

bottom, L to R

M. L. Kirchmayer
APPLICATION ENGINEER
J. A. Lyon
ORDER SERVICE DEPARTMENT

V. C. CABLE



Specify Roebling V. C. Cable for top resistance to heat, oil and grease

THROUGH continual laboratory developments and progressive manufacturing methods, Roebling Varnished Cambric Cable has been constantly improved. Today this cable has absolutely top resistance to heat, oil and grease . . . and it's the most dependable cable you can use for leads on generators, transformers, motor and oil switches, and for general distribution of heavy power loads in manufacturing and industrial plants.

Roebling V.C. is made in single conductor sizes from 2,000,000 C.M. to #14 A.W.G.; in multiple conductor sizes from 750,000 C.M. to #14 A.W.G. Recommended for use to 17,000v between phases in single or multiple conductor construction; and to 26,000v for single conductor grounded neutral.

Large quantities of Roebling's complete wire and cable line are now required for rearmament. We and our distributors will, however, do all that we can to meet your needs. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. & 120 S. HEWITT ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1301 CLARK BLDG. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY

Alcoa Expands Operations

Company puts Rockdale (Tex.) plant in service. New units scheduled by Vancouver (Wash.) and Bauxite (Ark.) works

Aluminum Co of America has been expanding its operations at Rockdale, Tex., Bauxite, Ark., Vancouver, Wash., and Lancaster, Pa.

Alcoa began production of the new aluminum smelting plant at Rockdale when the first of four potlines was recently put in service. The second potline is expected to be completed and ready for production this month. The third and fourth potlines are scheduled for completion next spring but will not be put into operation until the fall of 1953 when a new power plant will be ready.

When in full operation, the Rockdale plant will have a capacity of about 170 million lb of aluminum a year and will be the first aluminum smelter in the nation to use electric power generated by burning lignite.

Texas P&L to Supply Power . . . Power for the first two potlines will be supplied by Texas Power & Light Co until Alcoa's lignite burning power plant is completed. The plant being built by Ebasco Services, Inc., will be operated for Alcoa by Texas P&L.

The operations at Rockdale eventually will employ between 1,100 and 1,200 persons.

Aluminum Ore Co, a subsidiary of Alcoa, has announced plans for a proposed major addition to its new alumina works at Bauxite. The new facilities will be for manufacture of finished chemical products from alumina processed from bauxite mined in Arkansas.

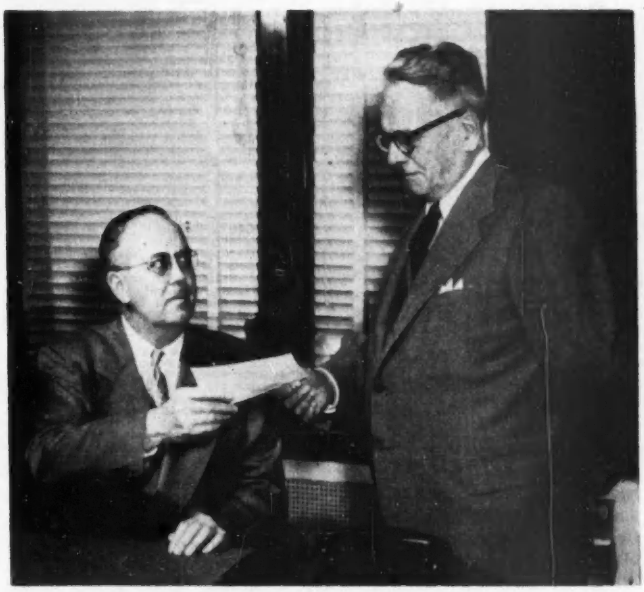
The plant, estimated to cost in excess of $5 million, is to be erected on properties already owned by Aluminum Ore. The site is adjacent to the alumina works which went into continuous production last month. Grading of the land for initial units at the new plant will begin some time next spring, depending on how quickly government authorizations can be obtained.

Northwest Operations . . . Since Alcoa expects to increase the cable producing capacity of its Vancouver Works, the company will start construction in January on a new development estimated to cost $1,720,000. The unit is scheduled for completion in late 1953.

The new facilities will include three new buildings having a combined area of 50,000 sq ft. The program calls for installation of additional modern cable-stranding machines and wire-drawing machines, which will produce all sizes of multi-strand aluminum cable and aluminum cable-reinforced, known as ACSR.

The Vancouver Works will also get a new building to house ingot-casting facilities. Work was started recently on the new addition, which is scheduled for completion in May, 1953. The plant, expected to cost $1.2 million, will produce extrusion sheet and several other types of fabricating ingots.

Lancaster Fabricating Unit . . . Alcoa has also revealed plans to construct a $3 million fabricating plant in the Lancaster, Pa., area. This plant will produce aluminum screw machine products, fasteners, rivets, and nails now provided by the company's Edgewater, N. J., plant. The Lancaster unit is expected to have a monthly



Wins 'Election-Prediction' Contest

Frank R. Innes, associate editor of Electrical World, is shown receiving a $100 Defense Bond for his "near" correct estimate in predicting Gen Dwight Eisenhower's winning presidential plurality in the recent "election-prediction" contest conducted by Minneapolis-Honeywell Regulator Co's Valve Division, Philadelphia. Presenting the award is W. H. Sisson, power industry sales manager of Honeywell's Industrial Division.

Innes topped more than 8,000 other amateur pollsters by coming within 4,000 votes of correctly estimating the winning plurality of 6,189,974 (Figure based on the plurality taken from the Nov. 6 issue of the New York Times). F. A. Braghetta, head of the laboratory at the Mare Island Naval Shipyard, Vallejo, Calif., won a $50 Defense Bond as runner-up. A $25 Defense Bond was awarded to 13 other contestants.

shipment capacity of in excess of 500,000 lb.

The operations to be relocated in Lancaster will make room for a planned expansion of Edgewater's aluminum sheet, impact extrusion, and foil production facilities.

The Lancaster plant will have 200,000 sq ft of floor space and will be erected on a site yet to be obtained. When in initial production, it will employ 350 workers with jobs for another 100 to be added later.

Ohio Valley, AEC Place $83.5 Million in Orders

Ohio Valley Electric Corp and the Atomic Energy Commission have placed orders totalling nearly $83.5 million with American firms for electrical equipment which will be used to supply power for AEC's $1-billion diffusion center now under construction near Portsmouth, Ohio.

Orders awarded by Ohio Valley include 11 200,000-kw turbo-generators and 11 boilers. Seven of the turbo-generators will be built by General Electric Co and four by Westinghouse Electric Corp. Babcock & Wilcox Co received the contract for the 11 boilers.

AEC has ordered from Allis-Chalmers Manufacturing Co six 100,000-kva, 3-phase, 330,000/13,800-v transformers and one 150,000-kva, 3-phase, 330,000/13,800-v autotransformer to supply power for its Portsmouth installation. Total value of this order, scheduled for 1955-56 shipment, is estimated over $3.5 million by Allis-Chalmers.

Five turbo-generators and five boilers will be installed in the 1 million-kw power plant to be built by Ohio Valley at Cheshire, Ohio. The other six turbo-generators and six boilers will go into the 1.2 million-kw station to be erected at Madison Ind., by the Indiana-Kentucky Electric Corp, an Ohio Valley subsidiary. Both plants will be constructed to furnish power requirements of AEC's Portsmouth project.

The first 200,000-kw unit is expected to be in operation at the Indiana station by January, 1955, followed two months later by the first unit in the Ohio plant. The fifth and last unit of the Ohio plant will be put in service by April, 1956, and the sixth and last unit of the Indiana plant by June of that year.

NEW ELECTRICAL CONSTRUCTION

A weekly selection of U. S. electrical construction projects announced by private and government utility systems involving more than $70,000. Also listed are major industrial and construction jobs where electrical work is indicated or implied

UTILITIES

Proposed Construction

Del., Dover—U. S. Eng., 121 N. Broad St., Phila., 1, Pa. transformer station and electrical distribution and street lighting sys., Dover Air Force Base, ENG 36-109-53-312.

Florida—Central Florida Electric Co-operative, Chiefland, 71 mi. rural distr. lines and sys. imprvs., Levy Co. $145,000.

Idaho—U. S. Eng., City—County Airport, Walla Walla, Wash., Lucky Peak Dam, Boise River, hoisting machinery for intake structure, $100,000; manifold valves, gates and machinery, $400,000; relocation of power and phone lines, $700,000.

Idaho—U. S. Eng., 4735 E. Marginal Way, Seattle, 4, Wash., power house equipment installation at Albeni Falls Dam, Pend Oreille River, $550,000.

Illinois—Illini Electric Co-operative, Champaign, 52 mi. rural distr. line, 16 mi. 69 kv. transmission line and sys. imprvs., Champaign Co. $690,000.

Ill., Chicago—Lake City Laundry Co., 520 W. 35 St., Zone 9, laundry power plant, $150,000. A. Epstein & Sons Co., 2011 Pershing Rd., Zone 9, archt.

Me., Limestone—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., generating plant, electrical work, incl. fdn. excav., concrete bridge, crane, Limestone Air Force Base, ENG 19-016-53-45.

Mass., North Reading—Town of Reading, Bd. Selectmen, Town Hall, Reading, municipal light plant, $200,000.

Michigan—Top O'Michigan Rural Electric Co., Boyne City, 199 mi. rural distr. lines, sys. imprvs., Charlevoix Co. $370,000.

Mich., Detroit—Storer Broadcasting Co., George Storer, pres., c/o WJBK, 580 Temple St., 10 story, brick, steel, concrete television station, TV and radio center with connecting tunnels to Fisher, General Motors and New Center Bldgs., on 20,625 sq. ft. area, Second and Bethune Sts. $3,500,000. Skidmore, Owings & Merrill, 100 W. Monroe St., Chicago 3, Ill., archts. for preliminary designs.

Montana—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., autotransformer for Sioux City sub-station Missouri-Oahe Dist., Missouri River Basin Proj. Spec. DS 2313.

N. J., Trenton—Morrisville Broadcasting Co., Morrisville, Pa., television station $215,000. William E. Benns, Jr., 2727 Kanawha St. N. W., Wash., D. C., consult. engr.

N. M., Algodones—Plains Electric Generation & Transmission Co-operative, Inc., Springer, power plant, $675,000. Total cost with equipment $4,600,000. Laramore & Douglass, Inc., 79 E. Adams St., Chicago 3, Ill., consult. engr.

N. M., Gallup—City, P. Utilities Comn., City Hall, steam generating unit, $800,000. Rocky Mountain Engineering Co., 325 Wilda Bldg., Denver, Colo., engr.

N. Y., New York—Bd. Water Supply, 120 Wall St., New York, Zone 5, Contr. 437, furnishing, testing, del. and unloading gasoline-engine generator sets with switchgear and appurtenances for West Branch and Kensico South Effluent Chambers of Delaware Aqueduct.

Oklahoma—Kiamichi Electric Co-operative, Wilburton, 99 mi. rural distr. lines, headquarters facilities, sys. imprvs., Latimer Co. $485,000.

Ohio—Inter-City Rural Electric Co-operative, Inc., Hillsboro, expansion rural transmission lines in 9-county area, Highland and Pike Counties. $980,000.

O., Toledo—U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va., constr. 69 kv. sub-station and feeders, Rossford Ordnance Depot, approx. 7 mi. south of here, Serial No. ENG 46-022-53-27.

Ohio—Inter-County Rural Electric Co-operative, Inc., Hillsboro, sub-station near AEC plant in Waverly area, new high tension wires and distr. sys., Pike Co. $980,000.

O., Dover—City, generating unit for municipal power plant, $1,500,000.

Oregon—U. S. Eng., City—County Airport, Walla Walla, Wash., transformers for units 11 to 14, $7,500,000; levee control and equipment yard, $550,000; main control boards, Units 9 to 14, $550,000; McNary Dam, Columbia River.

Ore., Portland—Cascade Television Co., c/o J. R. Latourette, Corbett Bldg., television station, $692,000. Kear & Kennedy, 1320 18th St. N. W., Wash., D. C., consult. engrs.

South Dakota—Bureau Reclamation, Dpt. Interior, Huron, constr. Wessler Sub-station, Transmission Div., Missouri River Basin Proj., in the SW¼ of Sect. 8 and in the NW¼ of Sect. 7, T. 2 N., R. 9 E., Meade Co., approx. 8 mi. northeast of Rapid City. Spec. DC 3849.

South Dakota—U. S. Eng., 1709 Jackson St., Omaha, Neb., powerhouse substructure and intake structure, spillway and earthwork, Stage II, Gavins Point Proj. near Yankton, Inv. 25-066-53-155.

Texas—Medina Electric Co-operative, Hondo, 250 mi. rural distr. lines, 22 mi. 69 KV transmission line and sys. imprvs., Medina Co. $940,000.

Tex., Rockwall—Texas Aluminum Corp., c/o Dick Pickens, Rockwall, electric distr. sys., 191-acre east of here, between Katy Ry. and Old Hy. 67. $100,000.

Low Bidders & Contracts Awarded

Connecticut—United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa., CA, $10,000,000 hydraulic plant on Housatonic River, New Milford and Lake Zoar-Connecticut Light & Power Co., 56 Pearl St., Hartford, Conn. Charles T. Main, Inc., 80 Federal St., Boston, Mass., engr.

Kansas—Thompson, Haight & Keister, 2004 N. Portland St., Oklahoma City, Okla. CA $206,185, 40 mi. rural distr. lines, Barton and Stafford Counties. Central Kansas Electric Co-operative, Great Bend, Kan. Bids Nov. 20.

N. Y., Rome—Malan Plumbing Co., Inc., 25-09 42 Rd., Long Island City, N. Y., CA $1,413,000, ground electronics storage and overall facilities, Griffiss Air Force Base, ENG 30-075-53-127. U. S. Eng., 80 Lafayette St., New York 13, N. Y. Bids Nov. 18, awarded Nov. 28.

Washington—English Elec. Export & Trading Co. Ltd., 23 Beaver St., New York, N. Y., LB, $4,406,493, four 67,368-kva generators for Chief Joseph Dam, Inv. 53-21, U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Dec. 3.

INDUSTRIAL, COMMERCIAL & PUBLIC BUILDINGS

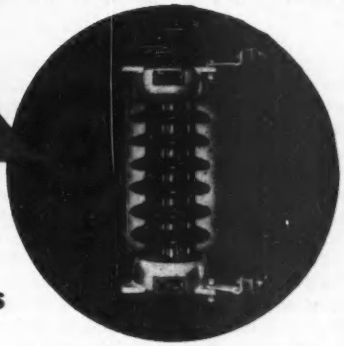
Proposed Construction

Ill., Hillside—Hubert E. Howard, 999 Lake Shore Dr., Chicago, Zone 11, plans by Bruce A. Gordon, 1 N. LaSalle St., Chicago, Zone 2, shopping center, 53½ acre at Wolf Rd. and Congress Expressway, $20,000,000.

O., Cleveland—Aluminum Co. of America, 2100 Harvard Ave., factory, 11-acres with 10-story bay to house 2 hydraulic forging presses (50,000-ton and 35,000 ton) for Dpt. Air Force, $10,000,000.

Tex., Rockwall—Texas Aluminum Corp., c/o Dick Pickens, Rockwall, aluminum fabricating plant, 191-acre site, east of here, between Katy Ry. and Old Hy. 67. $12,500,000.

Be on the SAFE SIDE



. . . specify O-B Maximum-Rated Thorex Lightning Arresters

Natural variations are inherent in any mass-produced product--including lightning arresters. How shall we recognize these variations in such an important protective device? To illustrate the problem, we have stacked 48 O-B Thorex arresters to represent the normal distribution curve of their IR discharge protective performance.

Only 16⅔ per cent fall into the central "average" column. Twenty of these arresters, or 42 per cent, are on the plus side of average not as good as average protective-wise. Your chances are equal of getting a below-average unit versus an above-average unit. 'Way out on the plus end is an arrester--the poorest that O-B factory inspection will pass. Yet this is the arrester O-B lists in its cataloged protective characteristics--the MAXIMUM unit. We wouldn't bring the matter up if we were not proud of the tall, narrow distribution curve of O-B Thorex performance, indicating close tolerance resulting from precise manufacturing control; and making the *poorest* Thorex arrester still a new high standard. The remaining Thorex arresters are as good, and in practically all cases better, than O-B MAXIMUM listings state.

If you want to be on the safe side in lightning arrester specifications--if it's definite protection you're buying--you get this with a bargain thrown in when you install O-B Thorex lightning arresters.

Ohio Brass

MANSFIELD OHIO, U.S.A.

4236-H

SECURITY ANALYSTS visit Con Edison's system operations headquarters at Waterside Station. About 150 analysts went on the tour

ELECTRIC BLANKET is modeled by Patricia Ludorf as Ed Holmberg illustrates his talk on Con Ed's electric blanket sales campaign

Analysts Get Inside Story from Con Ed

Consolidated Edison Co of New York has obtained total rate increases of $11.8 million annually with a probable maximum of $13.8 million, Harland C. Forbes, executive vice president, told 150 analysts at the first "Utility Analysts Day" at Con Ed on Dec. 11. "It will be nearly a year before the full effect of these adjustments will be reflected in our operations," he pointed out.

Offsetting these increases, he said, probably will be higher wages as the contract with Utility Workers Union, CIO, expires on Dec. 31 and higher tax rates.

No Immediate Financing . . . Forbes declared that there will be no new financing until "at least late 1953." In the meantime the company will obtain any additional funds it might need for construction from bank loans. At present they total $22 million and may go to as high as $50 million by next fall. He felt that it would not be a serious problem to fund any such loans.

Conversion of debentures which were issued in 1948 into common stock, he reported, has reduced the debt from $57 million to $7 million.

Regulation . . . Discussing the current regulatory picture, Cameron F. MacRae, a partner of Whitman, Ransom, Coulson & Goetz, counsel for the company, told the analysts that he thought there is a better feeling in the attitude of regulatory commissions throughout the U. S. toward the industry. He cited figures from a report of Arthur Andersen & Co, accountants and auditors, which showed that the rate of return for utilities had risen from 5.59% in 1948 to 6.14% in 1951.

A quick check for 1952, he said, shows that it is about the same as in the previous year. New York Public Service Commission in recent electric rate cases was allowing around 6%. He supported this statement by listing recent rate cases, namely, Central Hudson Gas & Electric Corp 6.07%, New York State Electric & Gas Corp. 5.7%, and Consolidated Edison Co of New York between 5.75% and 6%. He stated that the commission had excluded "all construction in progress" in determining Con Ed's rate base.

Expansion . . . Electric industry is growing constantly and does not seem to be limited by population figures, Chairman Ralph H. Tapscott told the meeting. He said that the system's everage use per residential customer will amount to 1,250 kwhr in 1952.

Appliance Dealer Cooperation . . . Vice Pres Charles B. Delafield described for the analysts the company's activities in promoting the use of appliances. He called on Edward Holmberg, Con Ed advertising manager, to detail Con Ed's sales program to help dealers sell electric blankets. Truck

Revenues and Other Increases
(Millions)

	Suggested by NYPSC	Obtained by Company	Probable Maximum to be Obtained by Company
Increase in Filed Rates	$ 6.8	$ 6.8	$ 6.8
Increase in Cnotract Rates	8.5	5.0	7.0
Total Rate Increases	$15.3	$11.8	$13.8
Less: Taxes (54%)	8.3	6.4	7.5
Net Rate Increase	$ 7.0	$ 5.4	$ 6.3
Depreciation decrease	4.5	4.5	4.5
Total Increase for Common Stock	$11.5	$ 9.9	$10.8

Note—In addition to the above, fuel-base rates approved by the PSC will probably add $3.5 million by the end of 1954, the company estimates.

and bill board posters, car cards, newspaper ads and television commercials were used to sell consumers on the comforts of sleeping under an electric blanket, Holmberg said.

The intensive campaign, Delafield reported, is expected to result in sale of 47,000 electric blankets from Oct. 1 to the end of December compared with 20,000 from Sept. 1, 1951 to Aug. 31, 1952. He said that every electric blanket put on the line means $4 a year in revenue for the company and added that blankets are a desirable load since they use power at a time when generators are not running at full capacity.

The analysts were also shown the East River Generating Station and the centralized system operations at the Waterside Station.

FINANCIAL BRIEFS

Central Hudson Gas & Electric Corp will sell $6-million first mortgage bonds 3.30% due in 1982 to 11 institutions at par . . . **Long Island Lighting Co** will borrow up to $40.3 million from banks at the prime interest rate to commercial borrowers at the time of each borrowing but not to exceed 3¼% . . . **American Gas & Electric Co** has asked securities and Exchange Commission approval to reclassify its common stocks from 10,041,081 shares of $10 par to 20,082,162 shares of $5 par . . . **North American Co** has received an order from the United States District Court for the District of New Jersey approving and enforcing the plan of the company, heretofore filed with Securities and Exchange Commission providing for the liquidation and dissolution of the company.

Stockholder Subscriptions—Commonwealth Edison Co's commonholders took 1,084,786 shares of 1,155,730 shares of $1.40 preferred stock $25 par offered on a 1-for-12 basis at $31 a share. Balance of unsubscribed shares amounting to 70,944 taken by an underwriting group headed by Glore, Forgan & Co and First Boston Corp . . . Western Light & Telephone Co's commonholders took 57,609 common shares of 65,168 shares offered on 1-for-5 basis at $22 a share. Remaining 7,559 shares were disposed of by Harris, Hall & Co.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
1952									
Dec. 11	**2.96**	**3.00**	**3.11**	**4.05**	**4.21**	**4.35**	**5.00**	**5.36**	**5.67**
Dec. 4	2.96	2.98	3.12	4.03	4.22	4.55	5.04	5.38	5.76
3rd 1952	2.99	3.03	3.16	4.10	4.26	4.61	5.18	5.39	5.96
2nd 1952	2.95	3.00	3.09	4.05	4.31	4.60	5.39	5.85	6.42
1st 1952	2.95	2.99	3.13	4.11	4.29	4.66	5.35	6.03	6.47
4th 1951	3.02	3.07	3.21	4.32	4.50	4.91	5.42	6.18	6.84

Data: Reis & Chandler, Inc.

EARNINGS

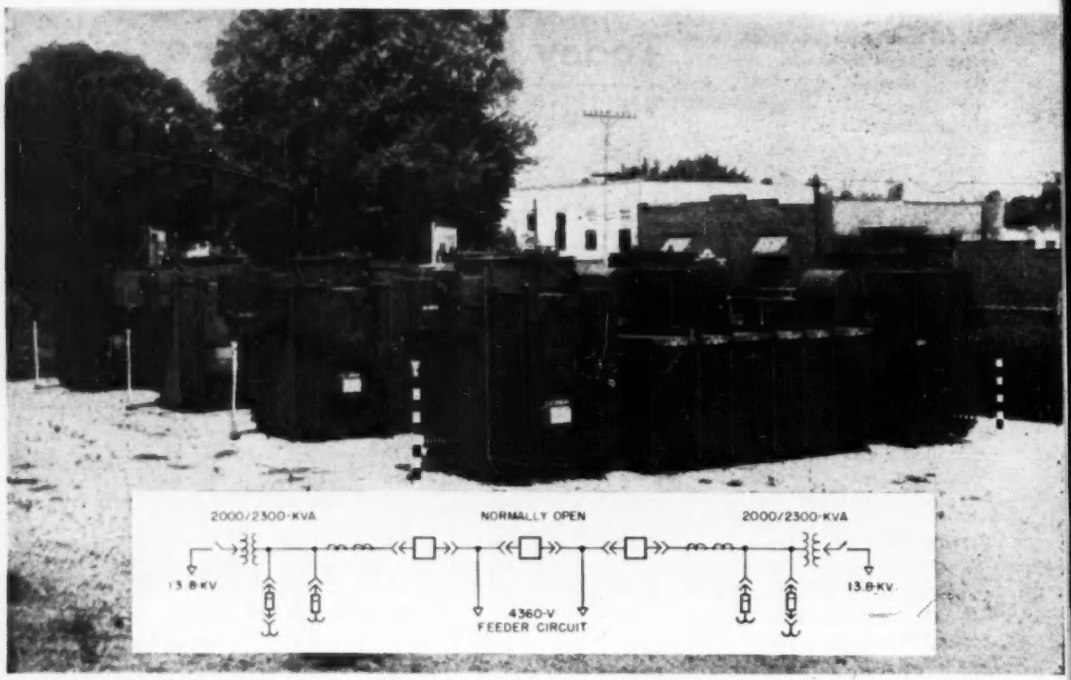
Company	Period Months Ended		Net Income 1952	Net Income 1951	Earnings Per Common Share 1952	Earnings Per Common Share 1951
Arizona Public Service	12	Oct.	$3,058,251	$1,867,655	$...	$...
Portland General Electric	12	Oct.	3,746,505	3,333,021	2.68(a)	2.46(a)

Notes—(a) Based on 1,395,833 average shares outstanding in 1952 and on 1,250,000 shares outstanding on Oct. 31, 1951.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF DECEMBER 11–17			
None			
WEEK OF DECEMBER 18–24			
Debentures			
Consolidated Gas, Electric Light & Power—conv. 3 1/4% 1967 (being offered to commonholders on basis of $100 debenture for each 30 shares of common, record Dec. 1 to expire Dec. 18)	$16,484	$100.00	3.25%
Common Stock			
Cleveland Electric Illuminating—557,895 sh (being offered commonholders on 1-for-5 basis, record Nov. 24 to expire Dec. 10)	$24,129	$43.25	6.10%
SCHEDULE FOR JANUARY			
Bonds			**Bid Date**
Salt River Project Agricultural & Improvement District, Ariz.—improvement bonds due 1960–1982	$5,000	.....	Jan. 7
Kansas City Power & Light—1st mtg	12,000	.....	Jan. 20
Ohio Power—1st mtg	22,000	.....	Jan. 20
Iowa-Illinois Gas & Electric—1st mtg	8,000	.....	Jan. 27
Jacksonville Fla. electric system	18,000	.....	Feb. 3
Preferred Stock			
Ohio Edison—150,000 sh $100 par	$15,000	.....	Jan. 13
Ohio Power—100,000 sh $100 par	10,000	.....	Jan. 20
Iowa-Illinois Gas & Electric—60,000 sh $100 par	6,000	.....	Jan. 27
Common Stock			
Southern California Edison—500,000 sh	.....	.....	Jan. 14
Ohio Edison—479,846 sh (to be offered to commonholders on 1-for-10 basis, record Jan. 8 to expire Jan 23; stockholders to be allowed oversubscription privileges; company will name subscription price)	.....	.....	Jan. 7#
Consumers Power—617,669 sh (to be offered commonholders on 1-for-10 basis, record Jan. 15 to expire Jan. 30; company will name the subscription price)	.....	.....	Jan. 14#
Southwestern Public Service—about 251,500 sh (to be offered to commonholders on 1-for-12 basis; stockholders will be allowed oversubscription privileges)	.....	.....	.....
West Penn Electric—264,000 sh (to be offered commonholders on 1-for-15 basis, record about Jan. 23 to expire about Feb. 9; company will name subscription price)	.....	.....	Jan. 10#
UNSCHEDULED AND UNDER CONSIDERATION			
Bonds			
Central Maine Power—1st general mtg	$6,000	.....	.....
Toledo Edison—1st mtg	7,500	.....	.....
Rockland Light & Power—1st mtg	5,500	.....	.....
Southwestern Public Service—1st mtg	12,000	.....	.....
Wisconsin Public Service—1st mtg	7,500*	.....	.....
Monongahela Power—1st mtg	10,000	.....	.....
Washington Water Power—1st mtg	10,000	.....	.....
Debentures			
Washington Water Power	14,000*	.....	.....
Preferred Stock			
Rockland Light & Power	5,500	.....	.....
Southwestern Public Service	2,000	.....	.....
Wisconsin Public Service	2,500*	.....	.....
Common Stock			
Central Maine Power	$5,000	.....	.....
Toledo Edison—500,000 sh	.....	.....	.....

Notes—*Estimated. # Date of competitive bids of purchase of any unsubscribed shares.



"BLOCK BUILDING" in Kansas City. Substation 45 points up "building block" method. Two G-E 4000/4600-kva master unit substations were installed in 1947, two more in 1949. One-line diagram (inset) shows type of standardized duplex station used.

Missouri utility plans ahead for expansion using standardized G-E unit substations

Kansas City Power & Light gains system flexibility with "building block" approach

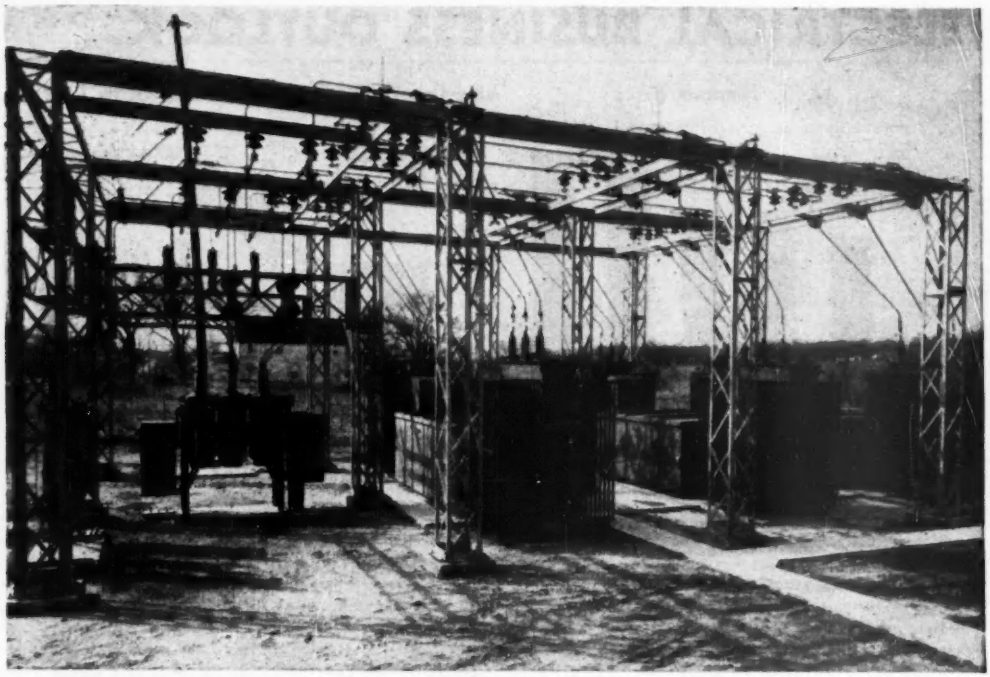
With 22 G-E standardized master unit substations installed over a five-year period, Kansas City Power & Light Co., Kansas City, Mo., knows the value of advanced planning—using duplicate units as "building blocks" in its system.

This "building block" method—which permits adding or removing capacity in easily handled, relatively small "blocks of power"—has enabled the Missouri utility to expand its system simply and economically. Engineers early decided upon the unit substation which best suited their purposes—in this instance, a G-E 4600-kva duplex unit.

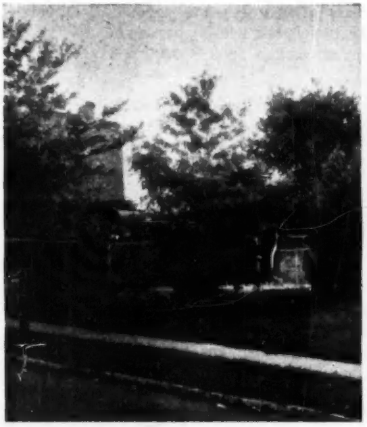
In addition, utility engineers have achieved maximum flexibility to take care of unexpected load growth. They can meet load shifts simply by shifting the standardized G-E units. If the load should change radically, they can move quickly to other types of standardized G-E unit substations, still employing the "building block" approach.

Your needs most likely parallel those of the Kansas City utility, and you, too, will find that advanced planning with the "building block" method keeps system investment as low as possible in relation to actual load. Small "blocks of power," with their flexibility and economy, give insurance against excessive investment in unused capacity.

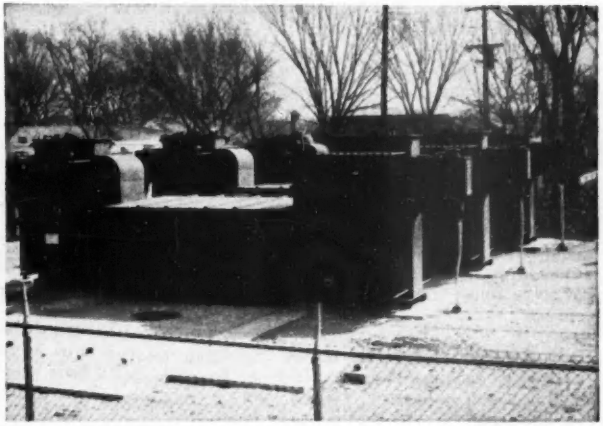
At the same time, G-E factory-assembled master unit substations simplify planning and purchasing—save time in delivery and installation. And with G-E equipment, you are assured of dependable, first-quality components made possible by repetitive manufacturing methods. For full information, write for Bulletin GEA-4500. *General Electric Company, Schenectady 5, New York.* 321-100



STANDARDIZED SUBSTATION. Supplied complete by General Electric, 3 units and steel structure of Substation 30 were delivered ready for immediate installation. Factory-engineered substations simplify purchasing, save valuable engineering time.



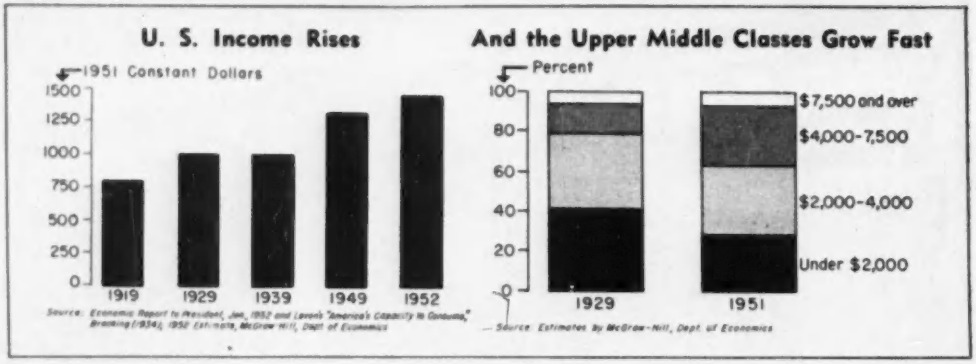
CONCEALED BY TREES. This one-unit substation in residential area shows how proper planting can effectively camouflage installations.



READY FOR NEXT UNIT. Kansas City's Substation 84 has three duplex units already installed. Foundation, in foreground, is set for fourth unit, if required for increased load.

GENERAL ELECTRIC

ELECTRICAL BUSINESS OUTLOOK



Income Changes Aiding the Industry

American incomes have been going through some well-nigh revolutionary changes in the past few decades. The distribution of income has shifted drastically—both between regions and groups of individuals. These changes and the general growth in income have major significance for electric utilities.

The bold facts of these income changes are striking. Real income per capita—after taxes and inflation are taken out—has just about doubled in the past 50 years and grown more than 40% just since 1929 (Chart). Increasing efficiency in industry and agriculture has boosted incomes throughout the country.

Shifts in distribution of income are even more impressive than the overall growth. Back in 1890, fully 54% of families and individuals earned less than $2,000 in 1951 prices after taxes. This group dropped to 41% in 1929, and by 1951 this bottom group included only 28% of all receivers of income (Chart).

The group earning more than $3,000 jumped from 25% in 1890 to 35% in 1929 and 54% in 1951. The big gains came in the middle income brackets, between $3,000 and $7,500. Thus, a large middle income class has been created.

Rich Get Poorer—Poor Get Richer . . . These income changes go hand in hand with a tendency toward greater equalization of all incomes. The less well-to-do are getting a bigger share of total income, and the upper brackets are getting less. One study shows that the top 1% got 17.2% of all income before taxes in 1929—and only 9% in 1948. After taxes, of course, their present share is even smaller.

Incomes once varied widely between regions. In 1929 per capita income in the Northeast was about 2½ times as large as in the Southeast. But, by 1951, per capita income in the richest region (now the Pacific Coast) was less than twice as large as in the poorest.

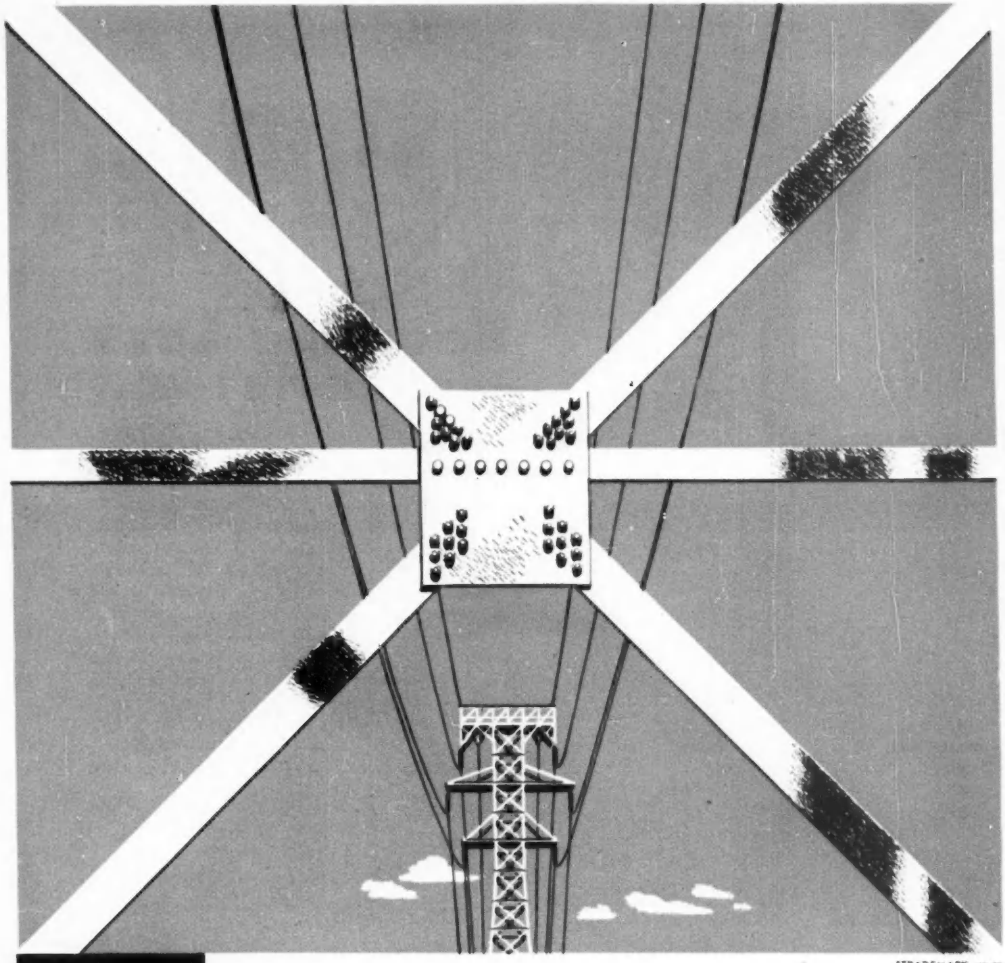
These changes indicate that the United States is becoming a more homogeneous market for consumers goods—including electric appliances and newer, electrified houses. The big variations in demand between regions will tend to disappear as regional incomes approach equality. For example: Today there are more new refrigerators in the Southeast area than in any other region in the United States.

Only a few categories of foods have gained more than electric appliances. Sales in 1951 were 227% greater than in 1929—a much larger increase than would normally result from increases in prices and population. Food—the chief necessity—gained 211%; horse and dog tracks, on the other hand, picked up 1,800%.

Housing Doesn't Do so Well . . . But there's one class of goods especially important to utilities that seems to be losing out in the race for the consumer's dollar. That's housing; consumers put 14.5% of their income into housing in 1929, only 10.5% in 1951. On the surface, at least, it looks as if housing does not share very heavily in the benefits from these income changes.

But the figures on housing may be misleading; they are held down by some special factors. For instance, housing's share of consumer spending is reduced by the big drop in mortgage rates since the twenties. Rates sometimes went higher than 15% then, rarely pass 5½% now. And rent controls have kept housing costs down for many families. So the chances are that housing is still a much higher priority need than the figures show.

All these developments add up to the appearance of a wider market for sales of power to consumers. The market is broader both geographically—as incomes across the country move toward equality—and in terms of total buyers, as average incomes rise everywhere. Whether future developments in income distribution will continue this trend is hard to say. But there's no obvious reason at present for believing otherwise.



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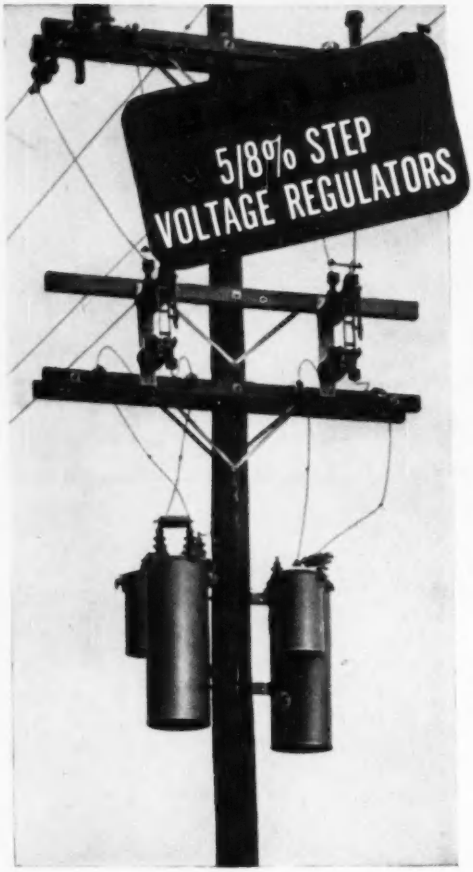

You can mount these regulators anywhere — on the ground or on a pole. Two of the three regulators for the installation shown above are on one pole; the other is on the next pole down the line.

Revenue Loss
on overloaded feeders

OVERLOADING FEEDERS at the cost of maintaining voltage is sometimes the only way you can keep up with expanding demand. It costs you revenue — and profits. You can keep revenue *up* on overloaded lines with Allis-Chalmers distribution regulators. They'll give you an accurate ± 1 volt band over a 20% operating range — plenty of room there for expansion.

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Full information is available at your nearest A-C district office. Call today or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3878

RATINGS AVAILABLE	7620 Volts—15, 50, 100 amp 5000 Volts—50, 100 amp 2500 Volts—100, 200 amp

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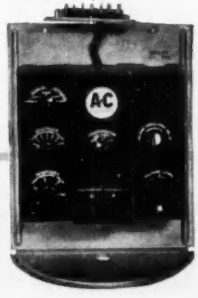
Accuracy of Allis-Chalmers distribution regulator controls cannot be upset by friction because of the new regulating relay. Its design is practically friction-free. The linked dual cantilever beam bearing, which is frictionless, replaces friction-type bearings and coil springs used in other types.

LESS CLEANING AND MAINTENANCE are required on relay contacts because they are made of platinum ruthenium. They will stand up under the type of service that causes ordinary silver contacts to become coated.

DESIGNED FOR FAST INSTALLATION . . . there's only one adjustment to make when installing — just set the calibrated voltage level.

GET COMPLETE FACTS on *Feather-Touch* controls. Write for Bulletin 01M7866-1.



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